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Has Hydrogenation Failed?

THE question is not, as it may well seem to be, taken from the columns of one of the more sensational dailies. It is a question which all must ask themselves who were present at the informal discussion held on February 14 by the Institute of Fuel, when Professor W. A. Bone opened a debate upon the economic and national aspects of the production of oil from coal. Unfortunately the rules of the Institute preclude mention of the names of the many distinguished speakers who followed Professor Bone; they were men who have held or are holding high Government, university and industrial positions. Without exception they condemned any further expenditure on hydrogenation of coal. There was not a voice lifted to express the contrary opinion. It is of importance to the chemical industry to know the truth. Home oil production is fashionable, because it is fashionable to preach economic nationalism, and because it is fashionable to believe that the nations are preparing for another world war.

The arguments adduced were briefly as follows. If home production of oil is to be of value sufficient must be made to take the place of the quantity imported and not, as at the present time, of $4\frac{1}{2}$ per cent. of the petrol and less than 2 per cent. of the total imported oil. The method of production must either be sound commercially or it must have advantages in relation to (a) increased coal consumption; (b) public finance; or (c) security in time of war that overshadow any monetary losses sustained in the process *per se*. Taking the probable cost of production by hydrogenation as 6d. per gal. and the present importation price of petrol as $3\frac{3}{4}$d. per gal., the question resolves itself into how far we are justified in spending sixpence to produce three-pence-three-farthings. The Exchequer, of course, loses more than $2\frac{1}{4}$d.—it loses 4d. per gal. on home-produced oil. The total number of miners and operatives put into employment by the present hydrogenation plant is 4,000, but for a new plant of the same size embodying the latest improvements it would probably be only 3,200; assuming that 22 such plants are needed to produce our petrol alone there would be employment of some 75,000 persons directly, from which is to be deducted, according to Professor Bone, x people who would otherwise have been employed in tankers and y people who would be making the goods now required to pay for the petrol; the gain in employment would be very small, in spite of a capital expenditure of some £100,000,000—perhaps £2,000 per man per year employed (net); at 5 per cent. interest on this money it would pay to keep the 50,000 men on the dole.

The argument therefore runs that neither from the viewpoint of coal consumption (employment of miners) nor from that of general employment is it worth while to subsidise home oil production to the extent (as one speaker calculated) of £2 10s. per ton of coal processed. On the score of national defence speakers were equally emphatic. To construct a plant for production of all our petrol supplies would require no less than 300,000 man-years; the construction must therefore precede the outbreak of war. To operate the plant and provide the coal would need 75,000 men—a serious drain on our resources in time of war. In times of peace our military aeroplanes work at very low load; in times of war their load-factor increases enormously, and at the close of the last war the allies had 28,000 aeroplanes. The peace-time requirements of petrol must be only a fraction of the war-time needs, so that multiplication of the present installation by 22 would be quite insufficient for our requirements.

So much for the opposition. We should, frankly, like to hear the other side. We do not believe that Imperial Chemical Industries would spend some £6,000,000 upon a project that was impossibly uneconomic from the beginning. Professor Bone and others who, in spite of experience of scientific work, have condemned hydrogenation and other synthetic oil schemes, seem to have neglected one factor of immense importance—the advances that may be made as the result of research. The only ground upon which the present installation was defended at the Institute meeting was that it would provide data upon which future policy could be based. We would remind those who base their argument upon present facts how very much has been accomplished since Bergius, then dubbed "a chemical adventurer," came to these shores with his incipient hydrogenation process. Can it be seriously believed that International Hydrogenation Patents, Ltd., which comprises some of the most important chemical concerns in the world, would have wasted its energies for so many years in the pursuit of what could have been seen from the beginning to be a chimera? Whilst there may be many potent arguments against the synthetic production of fuel oils, and whilst from the point of view of national defence we agree that we should store large quantities of oil in underground tanks in our derelict mines, we believe that future research will disclose methods whereby oils can be produced at much below 6d. per gal. It must not be forgotten that the $3\frac{3}{4}$d. is spent abroad, whereas the 6d. circulates wholly in this country.

Notes and Comments

Increased Industrial Production

INDUSTRIAL activity in the United Kingdom in 1935, as estimated from particulars furnished from various sources to the Board of Trade, was 7 per cent. greater than in 1934, the index numbers for the two years (based on 1930 = 100) being 113.5 and 106.1 respectively. For chemicals and oils the figures were 104.6 and 111.4 respectively. The improvement was distributed throughout the four quarters, the advance in the second half of the year being slightly greater than in the first six months. Comparing the figures for 1935 with those for 1934, the largest increases were in respect of non-ferrous metals (12 per cent.), engineering and shipbuilding (11½ per cent.), leather and boots and shoes (11 per cent.), building materials and building (10½ per cent.), and iron and steel (8½ per cent.). Smaller increases were recorded for chemicals, oils, etc. (6½ per cent.), textiles (5 per cent.) and food, drink and tobacco (5 per cent.). The output of coal increased by 1 per cent., while the provisional index for gas and electricity showed an advance of about 8½ per cent. The index numbers for the December quarter of 1935 represent the greatest volume of production in any quarter for which information is available. Important increases were recorded for textiles (11½ per cent.), chemicals, oils, etc. (9½ per cent.) and iron and steel (7½ per cent.). As compared with the corresponding quarter of 1934, the greatest expansion was shown by iron and steel, chemicals, oils, etc., and leather and boots and shoes.

Why the Brute is Ill

SIR ROBERT McCARRISON'S third and last lecture this week was the fit end of a masterly series of expositions. He has laid foundations upon which all future workers must build. His main theme is that faulty food and feeding, the faulty nutrition to which these give rise, are a principal cause of ill-health; this he drives home by a series of experimental proofs. The poorer-class Englishman is no better off in diet than the Madrassi, who stands lowest in the scale of health in India. The well-to-do also suffer from ill-chosen diet, as well as from deficiencies in the diet they use. Particular stress was laid upon the deficiency of vitamin B, owing to the wide use of white flour and to the inordinate consumption of refined sugar; this last he regards as one of the most serious addictions of the day. Gastro-intestinal complaints are largely due to this B deficiency. There is little doubt that the fashionable modern complaints in children, which have been so profitable to the surgeon, adenoids and the like, are due to misfeeding—not to aluminium saucepans, be it said, parenthetically. When people are properly fed, surgeon and dentist as well as the medicine man will find their wings clipped. Great stress is laid by Sir Robert upon the value of *fresh* vegetable food; in India this has been found to lose most of the C vitamin within seventy-two hours of gathering. In view of these lectures, it would seem desirable that some further appeal to Caesar against Bumbledom should be made. If sources of vegetable supply are to be ruthlessly destroyed, there is little to be gained by appointing international committees on nutrition. The provision of fresh vegetables is complemental to the provision of milk—the one, Sir Robert McCarrison insists, is as much a necessity as the other. He ends by advocating that instruction in the principles of nutrition should be given in schools; he would even allow children the actual experience of feeding animal pets in different ways, so that they see for themselves the influence of food on health and growth. Good, Sir Robert! We thank him and the Royal Society of Arts especially for bringing him to expression.

Indigestion

IT is impossible to judge a film by looking at its title. The same may be said of some of the papers presented to chemical organisations. A few days ago, for example, Dr. P. F. C. Gartshore spoke to the Andersonian Chemical Society at Glasgow, on "Indigestion," but the paper was, from the point of view of interest and originality, the reverse of what the title would lead the members to expect. Dr. Gartshore talked of mental indigestion—the effects of swallowing our mental food whole, and there is a great deal of truth in what he said, particularly in regard to the acquisition of chemical knowledge. We try to absorb far too much and as a result we have no time to chew it properly. We sit in lecture theatres and take down notes hurriedly. We go home and learn them off by heart, hurriedly. We come back and try to use them in the examination rooms, hurriedly; then we forget them, very hurriedly indeed. It is not altogether our fault; it is largely the result of our educational system. As a futile relic the examination system scores 100 per cent. It was invented by the Chinese and established by the Emperor Wu Wang of the Chou dynasty about 1115 B.C., and we, with all our vaunted western progressiveness, are still using it. Speaking of the rapid advance of chemical science, Dr. Gartshore suggested that a good case could be made out for stopping all new work until we have cleared up and checked the work of the past thirty years.

Chile Interested in Billingham

WE are authoritatively informed that there is considerable interest in Chile in regard to the coal hydrogenation petrol plant of Imperial Chemical Industries, Ltd., at Billingham. Chile, it appears, is rich in a rather inferior grade of coal which might be made to yield a high percentage of liquid fuel, and its scientists are therefore eager to learn all they can about the hydrogenation process as practised in this country. We need not remind them that so far as Billingham is concerned the scheme is a large-scale experiment, the economic results of which can only be ascertained after prolonged operation. Conditions in Chile and the North of England are not strictly comparable, and it may be that petrol can be produced more economically in South America than it can in this country. In any case we commend to Chile a careful study of the paper which Mr. K. Gordon presented some time ago describing the Billingham plant side by side with the report of the informal discussion at the Institute of Fuel appearing in THE CHEMICAL AGE last week and to-day in which the economics of the process have been frankly debated.

The Chemist in the Modern Power Station

Collaboration with the Engineer

A PLEA for closer collaboration between engineer and chemist, not only for the production of new structural materials, but also in the more immediate sampling, analytical control, and interpretation of results, was made by Mr. G. W. Hewson, F.I.C., M.I.Chem.E., in a paper on "The Chemist's Job in a Modern Power Station," read before the Newcastle Section of the Society of Chemical Industry on February 7.

Hitherto the personnel and equipment of the chemical department of many power stations have been very much restricted and cramped, and hence the value of chemists in the eyes of others has been very low, said Mr. Hewson. The fuel as arriving should be sampled and analysed for purposes of checking quality of delivery against supplier's undertaking, and further as a check against the samples taken in the boiler house for purposes of arriving at the efficiency of the boilers themselves. Boiler efficiency is not merely a figure to ascertain the value of the plant supplied by the maker, or to put on record in periodic returns, but is a valuable guide as to economic working of the boilers week by week. For this reason it is essential that each contributory item in the ascertainment of that efficiency should be as accurate as possible.

Fuel Analysis

When any new supply of coal is contemplated a large representative sample should be taken from a bulk delivery, and submitted to thorough examination in the laboratory. Even when exhaustive analysis of a fuel indicates the desirability of using it, it is very essential that an extended trial over a period should be given, under operating conditions and under close observation of both engineers and chemists. Examination of the deposits of dust on boiler tubes has in some cases revealed segregation of the inorganic constituents of the fuel; further research on this subject is being pursued by the Edison Electric Institute of America, and the Fuel Research Board in this country. The former has also established the interesting fact that deposits adhere to boiler tubes very much below the actual fusion point of the ash as ascertained in the laboratory, and below the fusion point of the adhering deposit itself.

Whereas "water softening" was at one time considered adequate treatment for feed water, now more complete scientific preparation is called for, to which the term "feed water conditioning" is applied. This calls for careful chemical consideration and control. No part of power station chemistry has received more publicity and attention than this, and with increasing temperatures and pressures in the boilers no part demands more serious thought.

Corrosion and Scale Formation

Corrosion and formation of scale with their attendant consequences have been a constant source of anxiety to boiler house engineers since the introduction of water-tube boilers, but during recent years so much has been said about another serious trouble, which has been attributed to inadequate or incorrect water conditioning, that the possibility of so-called "caustic embrittlement" has been ever present to the mind of those responsible for boiler house operation. The cry of "caustic embrittlement" is the finest slogan invented to protect boiler makers and others against complaints about the quality of steel used in fabrication, and has been adopted in recent years to augment the demand for an increasing list of chemical additions to the feed water to prevent catastrophe. Many failures of boilers which should have been attributed to bad steel have been wrongly diagnosed as due to caustic embrittlement.

In modern power stations the make-up feed water is prepared by evaporation and condensation with subsequent deaeration, thus ensuring that all the feed is theoretically at least pure distilled water, and with careful supervision this should be practically possible for all but rare occasions; hence, why persist in methods of treatment so long practised for entirely different conditions? At two newly-built stations with which the author is identified evaporated make-up is the practice which has been followed for periods of seven and nearly three years respectively, but with no further treatment of the water either before entering or whilst in the boilers, as a general practice. There have been no adverse results, and satisfaction has been expressed by boilermakers, insurance companies and operating engineers. This, of course, has simplified water treatment, reduced to a negligible amount labour needed for water softening, scaling of boiler tubes, etc., and has kept the tubes in a state of cleanliness to maintain a high degree of heat transfer and efficiency. This does not, however, allow for any relaxation of vigilance on the part of the chemical staff to detect at once any sign of contamination from evaporator carry-over or condenser leakage.

Testing Water for Acidity

It is frequently stated that condensed water is slightly acid, showing a *p*H of 6.0 to 6.5, and it is insisted that the feed water must be treated to produce a *p*H of 9 or 10, or corrosion will result. Such statements may have applied in the early days of power generation, but they must not be too literally applied to modern plant. Just as it is important when testing feed water for oxygen content, to collect the sample and add the reagents out of contact with air, so it is equally important to collect the sample and *test for acidity out of contact with air.* Water which has been produced by condensation from steam, and de-aerated, rapidly absorbs oxygen and CO_2 when exposed to the atmosphere; this is an important factor often overlooked. It must also be noted that condensed steam has no buffering action on the *p*H indicator, and that the latter imparts a definite acidity or alkalinity to the sample being tested. It is therefore necessary to use the minimum amount of indicator, and to have the actual *p*H of the indicator solution approximately equal to the *p*H of the sample of condensate. With purely evaporated make-up the *p*H value of the condensate is usually found in practice to be a little over 7.3, and in general this does not need making up to *p*H 9 or 10 when the oxygen concentration is kept very low.

With modern methods of de-aeration very low concentrations of oxygen content can be maintained, and with low oxygen content goes low CO_2 content. There is, therefore, a minimum tendency to corrosion. One part per million dissolved oxygen is approximately as corrosive as 20 parts per million dissolved CO_2.

Corrosion in Drums and Tubes

Corrosion in drums and tubes has frequently been attributed to faulty feed water, when the real cause lies entirely outside operating practice and is due to lack of care in blowing down and emptying a boiler before opening up for internal inspection. In too many cases a quantity of water has been left in drums and tubes exposed to atmosphere, thus greedily absorbing oxygen and CO_2, and then when inspected under cold conditions rust cones, etc., have been abundant, and created alarm. Too much care cannot be exercised in blowing down and emptying the boiler, under slight pressure if necessary, before opening to atmosphere.

Combustion is not so simple as is sometimes imagined, but is a highly complex series of chemical reactions, and a proper appreciation of the physico-chemical principles involved in it can do much to illuminate the mysteries and dogma which enshroud so often the methods of control. It is now possible to burn coal in such a way that more than

15 per cent. of carbon dioxide can be maintained in the flue-gases without raising the concentration of unburnt gases above 0.1 per cent., and with perfect freedom from smoke. Boiler efficiencies of the order of 90 per cent. are now a commonplace of everyday operation, but to maintain them at the highest possible figure and so make full use of the improvements of plant design requires most careful control.

Old methods which have served well in the past are no longer applicable. For example, flue-gas analyses were once satisfactory if they were correct to ±0.2 per cent.; but there is now a call for analyses which are accurate to ±0.2 per cent., and it is at once obvious that the old method of estimating carbon monoxide by absorption in cuprous chloride in an Orsat apparatus *must be replaced*. It is better to collect a uniform sample over a long period—if need be 24 hours—over mercury, and analyse this sample fully in the laboratory in an apparatus of precision, such as the Haldene apparatus as modified by Graham, which will give the concentration of unsaturated hydrocarbons, carbon monoxide and hydrogen with a maximum error of ±0.02 per cent., and permit a slow combustion analysis of the residue (methane, ethane, etc.). A sample collected over a long period in this manner cannot be relied upon to give accurate concentrations of carbon dioxide and oxygen since these are affected by sustained contact with wet and possibly dirty glass.

A great deal of public attention has recently been directed to the chimney emissions, particularly from power stations, which have apparently been singled out for exceptional treatment. Two systems of British origin have been evolved and put into operation on a large scale. These are the processes sponsored by Imperial Chemical Industries, Ltd., and the London Power Co., Ltd., full descriptions of which have already been given in the technical Press.

Switch, transformer, turbine and other oils also frequently call for examination, and a modern power station chemist must be prepared to make an examination, not only on the lines laid down by the British Standards Institution and the Institution of Petroleum Technologists, but also to study them in relation to their behaviour during service. This particularly applies to turbine oils, which should be regularly examined for acidity and sludge content, together with determination of the composition of the sludge; the latter may reveal the cause of sludge formation and help in its elimination. In the matter of sludge and water, separation of these by centrifuging a portion each day is the usual practice, and the makers of the centrifuge cater for filtering the oil at an elevated temperature, thus ensuring more rapid filtration and hence a larger output. This totally ignores the fact that hot oil dissolves some sludge, which again deposits on cooling, hence the desirability of provision being made when opportunity is afforded of shutting down the turbine, to run the whole of the oil into a tank where it can be at rest, and the sludge settle to the bottom, to be later tapped from the bulk of the oil.

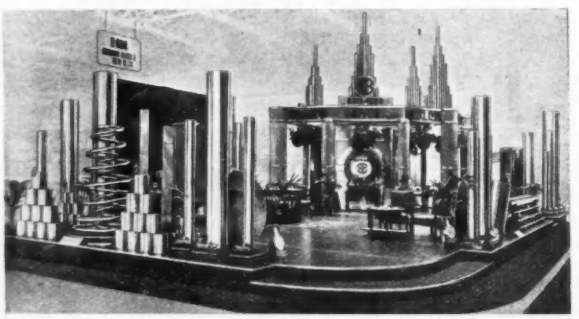
A modern power station chemist must be prepared for and conversant with the lines of investigation necessary for corrosion problems, and also be somewhat familiar with the findings of others who have had cases similar to those which may come under his observation.

THE construction of stills and other equipment for the distillation of medicated spirits in Ceylon is nearing completion and it is hoped to begin production shortly. The capacity of the stills erected at present is stated to be between 80 and 100 gal. a day, which, according to the applications received from Ceylon's medical practitioners, would meet the local demand. The services of a European chemist have been requisitioned for the purpose of taking charge of the research department. Educational work is going on in the neighbouring countries of India, Burma and the Malay States for the purpose of developing an export market.

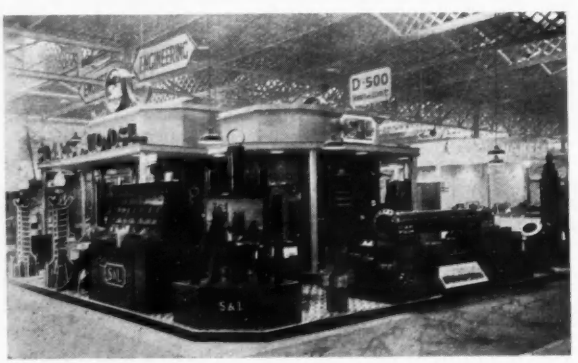
Stands at the British Industries Fair

WHILST this year's British Industries Fair was designed on broadly similar lines to previous years there was evidence in several directions of improved artistic taste in the layout of stands. Here are three particularly attractive displays, that of B. Laporte, Ltd., in the chemical section at Olympia, and those of the Birmingham Battery and Metal Co., Ltd., and Stewarts and Lloyds, Ltd., in the heavy industries section at Birmingham.

B. Laporte, Ltd. (Olympia).



Birmingham Battery and Metal Co., Ltd. (Birmingham).



Stewarts and Lloyds, Ltd. (Birmingham).

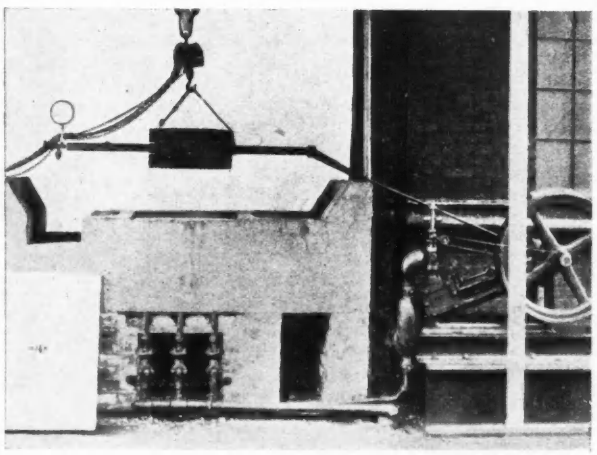
Early History of the Bergius Process

Fuel Research Board's Review

BY the publication of Fuel Research Technical Paper No. 42, "The Action of Hydrogen on Coal—Part II—Early experiments with the Bergius Process" (H.M. Stationery Office, 1s. 3d. net) the Department of Scientific and Industrial Research reveals that the process which forms the basis of the "oil from coal" plant at Billingham was first discovered by Bergius in Germany as the result of applying hydrogen under pressure to "artificial coal" produced by him from cellulose and peat.

This report makes public for the first time the results of many early experiments on the conversion of British coals into oil and describes how the British Government acting through the Department of Scientific and Industrial Research and its Fuel Research Board ensured the development in this country of the process covered by the Bergius patents. The issue of the report also makes it clear that in view of the great importance of securing adequate oil supplies from British coal, the Department considers it highly desirable that the knowledge gained in every stage in the development of this process should be fully available to British technicians.

Bergius, the report states, had evolved apparatus for working under high pressures as early as 1910, and after studying a number of other reactions he heated cellulose and peat in



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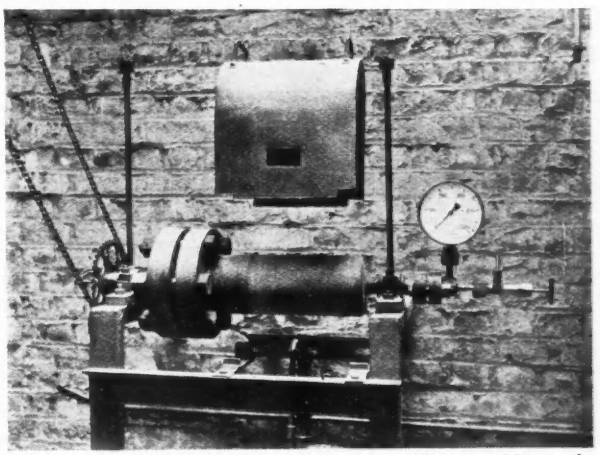
Early Type of Converter made at the Fuel Research Station.

the presence of water to 340° C. at a pressure of 150 atm. The products were black solids which he considered similar to natural coal and which he called "artificial coal." Later, Bergius turned his attention to heavy petroleum oils which when heated under pressure in hydrogen gave a quantity of light spirit. On treating his artificial coals in a similar manner, Bergius obtained a 70 per cent. conversion into oil soluble in benzene. Natural coals were then found to behave similarly, and in 1914 Bergius patented the application of the process to coals and other solid carbonaceous substances.

British Coals Tested in Germany

Further development was delayed during the war and, owing to the cost of high-pressure work, little was done until 1921 when a plant on a semi-industrial scale was erected at Mannheim-Rheinau in Germany for treating oil. Research on the process was also initiated at the Fuel Research Station, Greenwich, in 1923 with a small home-made converter. From the experiments there, it was satisfactorily established that the Bergius process afforded a means of obtaining much higher yields of benzene soluble material from coal than were obtainable by any other known method.

In 1924 the British Bergius Syndicate was formed which obtained an option on the patent rights of the Bergius process covering the British Empire, and experiments were carried out at Mannheim-Rheinau to test the suitability of British coals for the process. The preliminary results obtained were



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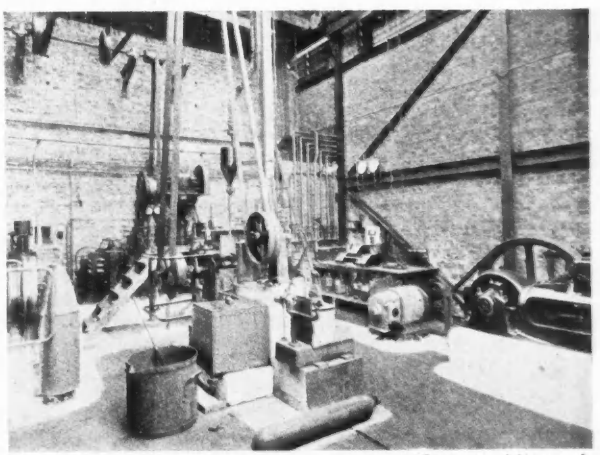
Bergius 2-litre Converter.

favourable and were communicated to the British Government. In view, therefore, of the importance to this country of any practical means of obtaining liquid fuels from British coals, it was decided that the Department of Scientific and Industrial Research should proceed with the investigations.

An agreement was accordingly entered into between the Department, the British Bergius Syndicate, the Internationale Bergin Compagnie and Dr. Bergius, whereby the option on the patents of this country which were shortly running out was continued.

Further experiments were carried out at Mannheim-Rheinau, in Germany, on British coals. These experiments were supervised by a committee consisting of two representa-



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General View of Main Room of Bergius Plant.

tives of the Department, two representatives of the British Bergius Syndicate and Dr. Bergius and in them trials were made with coals from various parts of the country in small converters, while "Orgreave washed slack" obtained from South Yorkshire was selected as a suitable coal for tests in a continuously operated plant. Here the results were again

promising and a plant embodying the latest improvements resulting from the work in Germany was supplied to the Fuel Research Station. This plant was installed towards the end of 1926, and in 1927 the small-scale experiments carried out at Rheinau were terminated by agreement and the work continued at the Fuel Research Station.

In describing the process as evolved originally by Bergius, the report under review states that his converters were at first glass lined, and then made of plain steel. They were rotated about a horizontal axis, with pebbles within to assist stirring; about 100 atm. was the working pressure, and they were heated externally, either by gas or electricity, for about one hour. After removal, the products were distilled and treated by benzene extraction, the material so recovered being known as "oil."

At a later stage in the evolution of his process, Bergius added oil to the charge, at first to avoid local overheating, and later to help in the working of a continuous plant into which a mixture of coal and oil could be pumped in the form of a paste. A further modification was the addition of a proportion of "luxmasse," which consists largely of iron oxide with some alumina and titanium, to the charge in order to fix the sulphur in the form of iron sulphide.

Other British coals from the Nottingham and Derby, South Yorkshire and Durham coalfields were then tried, generally with satisfactory results. In the course of the work at the Fuel Research Station, the early stages of the reaction were studied and it was discovered that below the temperature of 450° C. normally employed by Bergius, the coal underwent marked changes. Thus, at about 370° C. in the case of a bituminous coal, reaction between the coal and hydrogen took place rapidly and resulted in the formation of a plastic material. If the products were allowed to cool immediately after reaching this temperature a solid product was obtained which had every appearance of having been through a fluid condition.

The continuously operated plant at Mannheim-Rheinau consisted of two horizontal reaction vessels in series, contained in baths of molten lead, heated by gas, and fitted with simple mechanical stirrers. A paste consisting of tar, coal and luxmasse was forced through these vessels, with hydrogen, at 150 atm. pressure. Various modifications were tried and numerous tests carried out with varying success, details of which are given in the present report. The equipment which was installed at the Fuel Research Station as a result of the work is also fully described. It provided a continuously operating plant capable of dealing with a ton of coal a day, embodying all features of the latest practice, at the time of erection, of the Bergius Research Institute, together with an adequate plant for making hydrogen.

Chemical Works Pumping and Acid Handling

A Wide Choice of Equipment Available

SOME aspects of chemical works pumping and acid handling were discussed by Mr. E. A. Reavell at a meeting of the Chemical Engineering Group of the Society of Chemical Industry, held in London on February 14, Mr. Stanley Robson, chairman of the Group, presiding. Although reference was made to materials of construction, no attempt was made to deal with the extensive and ever-recurring subject of corrosion. The paper consequently reviewed generally the methods which can be used, described some of the available types of pumps and other acid-handling equipment, and suggested some of the more important factors to be considered in selecting and using plant of this type.

The methods of handling acids and corrosive liquids in chemical works divide themselves under two main headings, *viz.*, displacement by compressed air, and mechanical pumping. Under the former heading there are acid eggs, elevators, etc., whilst under the latter heading there are pumps of the centrifugal, rotary and plunger types, with or without glands. The displacement method, using compressed air, has the advantage of low first cost, simplicity, and ease of manufacture of the parts in contact with the corrosive medium. Generally, the moving parts subject to corrosion are limited to simple valves and there are no rapidly moving parts as in pumps. The main disadvantage is the low efficiency which usually exists; in addition, the compressed air is often obtained from a compressor which supplies a number of units and if the compressor fails the whole of these units have to be shut down. With pumps, however, each pump is usually a self-contained unit.

Need for Different Types

It was obviously impossible to recommend any one method or type of plant for all conditions, said Mr. Reavell, as the requirements of the chemical industry are so wide that they can only be covered by a range of many different types. As a broad division there was the glandless pump, and those fitted with glands, and, although the latter had been greatly improved and the design adjusted to chemical works conditions, the advantages of a glandless pump must be seriously considered in making a decision, as, for example, the lower maintenance costs due to the absence of glands. Although some centrifugal pumps with glands for non-corrosive liquids had a specially high mechanical efficiency, generally there was nothing to choose in this respect between pumps with and without glands when dealing with acids and corrosive liquids. Plunger pumps were mostly confined, so far as very corrosive liquids were concerned, to sulphuric acid. They had a higher mechanical efficiency than centrifugal pumps and in consequence had very definite advantages when acid had to be pumped continuously at minimum cost. Rotary pumps were less generally used for corrosive conditions, their principal application being to handle viscous liquids or to pump non-corrosive solutions against higher pressures than could be conveniently obtained with centrifugals.

Some Interesting Apparatus

The paper illustrated and described a number of acid pumping and handling apparatus such as the Oldbury patent carboy discharger, the Kestner automatic elevator, the Tungstone pump, the Lennox horizontal centrifugal pump, the Lee-Howl non-clog pump, the Gwynne-Doulton stoneware pump, the two-stage Haughton centrifugal pump, the Lennox vertical centrifugal pump, the Kestner glandless centrifugal pump and the Howard rotary pump, but it was pointed out at the same time that these types were selections of typical apparatus and that the pumping problems in the chemical and allied industries are of such diverse nature that it was impossible to mention many other types of pump and handling plant which were satisfactorily fulfilling the conditions required.

There was a long and detailed discussion upon the paper which brought out many features relating to the design and construction of acid-handling pumps, and it was hinted that the time has come when another symposium could well be held to deal with this subject. Reference was made to the symposium which was held at Newcastle at the second meeting of the Chemical Engineering Group, 16 years ago, and to the great advance that has been made in acid pumps since then in every way. Nevertheless, the discussion made it clear that there are still difficulties to be overcome, which could well bear discussion at greater length than is possible at a relatively short meeting with one paper.

The Dyeing of Natural Silk and Rayon

Disadvantages Overcome by the New Solacet Colours

A MEETING of the Manchester Section of the Society of Dyers and Colourists was held on February 21 when Mr. F. S. Tomlinson, Ph.D., B.Sc., read a paper on "The Dyeing of Silk and Rayon." Mr. L. G. Lawrie presided.

Raw silk, both in handle and appearance, said Dr. Tomlinson, was quite unlike the beautiful finished product and would hardly be associated with it. In the raw state it might be regarded as being composed of two constituents differing considerably in certain properties. These constituents were the actual silk fibre as seen in the finished article, and an outer covering generally described as gum. It was the presence of the gum which accounted for the dull appearance and hard handle of raw silk. In colour the silk varied according to origin, some being a rich golden yellow and others white. The gum was fairly soluble in hot water and might be readily dissolved by a weak alkali or a solution of soap. The inner portion, on the other hand, was quite insoluble in soap solution or weak alkali, and upon this depended the process for the removal of the gum.

Removal of Gum

Raw silk contained roughly 20-25 per cent. of gum, and its removal entailed a loss in weight which in many branches of the silk industry was made good by means of vegetable or mineral weighting. The usual method of degumming was to treat the silk in a bath containing 8-10 parts of soap per 1,000 parts water, for one hour at or near the boil. In the case of yellow silk, intended for delicate shades, it was desirable after this to transfer the silk to a fresh bath of similar strength and work for about half an hour. This removed traces of yellow colouring matter, which would otherwise remain and interfere with the shade. The liquor resulting from degumming in boiling soap and which was known as "boiled-off" liquor, was used by most dyers of silk yarn and pieces as an addition to their dyebaths, where it functioned as a levelling agent.

Bleaching was necessary for the production of certain delicate tints, and this might be carried out by one of the two processes in general use for this fibre; *i.e.*, by stoving or by hydrogen peroxide. Natural silk might be dyed with all classes of dyestuffs, with the exception of specialities for application to acetate rayon, and the possibilities in the colouring of this fibre were therefore numerous and various requirements might be catered for.

Acid Colours

Basic colours had an excellent affinity for pure silk, but the colours were only of interest for the production of shades of maximum brightness when fastness was of no importance. Acid dyestuffs were widely used and the class included colours of varied fastness and great utility. Many of the shades obtained were as brilliant as those produced with basic colours, while others were sufficiently light-fast to be defined as excellent. Acid colours were usually applied from a boiled-off liquor bath acidified with sulphuric acid, though a few were best applied from a bath acidified with acetic acid The proportion of boiled-off liquor in the bath might be varied according to the requirements of the dyestuffs employed. A limited number were capable of being dyed from a neutral bath with the addition of Glauber's salt. These colours were particularly useful in connection with the dyeing of silk hose or tin-weighted silk.

For the production of shades of good all-round fastness, the direct cotton colours were largely used. Many members of this group were of very good light fastness and water and washing fastness was, generally speaking, superior to that of the acid colours. Several direct colours were applicable from a neutral bath with the addition of Glauber's salt; others required the addition of a little acetic or formic acid as a means of obtaining better exhaustion, while many were devoid of affinity for silk unless an acid was present. Among the direct cotton colours were those which were improved in fastness by after-treatment with formaldehyde or by diazotisation and development, but as diazotisation and development were somewhat lengthy they were not adopted unless circumstances made them essential, after-treatment with formaldehyde satisfying average demands.

Shades of superior washing fastness and capable of standing a boiling soap solution were obtainable with the mordant colours, a chromium chloride mordant being generally used. Sulphur colours were also used on pure silk for purposes where outstanding fastness was essential. A sulphur black applied by the Lodge Evans process would give a fine bloomy black shade, which would withstand a boiling soap bath, without bleaching, for many hours.

The weighting of silk was usually accomplished by the use of tin salts and for this reason the number of colours which could be used for dyeing this material was limited to the basic colours and those acid and direct cotton colours which could be applied from a neutral bath and by means of Glauber's salt only, as the use of acid was inadvisable due to the danger of breaking down the tin complex.

An Important Advance

In the course of his paper Mr. Tomlinson referred to the introduction of the Solacet colours. While the insoluble colours of the Duranol and Dispersol type had been quite satisfactory for most purposes, he said, it was felt that in at least two directions they could be improved on. One of these was printing, in which it was always an advantage to use a water soluble colour rather than a dispersed paste. The other possible source of improvement was in dyeing heavy crepes. Up to the present time the dyeing of heavy crepes containing acetate silk had presented some difficulty due to the long time of dyeing required to obtain complete penetration. In many cases the dyeing of these materials took as long as 8-10 hours, whereas the time usually employed for dyeing plain fabrics was about 2-3 hours.

It was realised that if water soluble dyestuffs similar in fastness properties to the existing types could be obtained, a great step forward would have been taken and accordingly the Solacets had been produced. These were water soluble dyestuffs which were applied to acetate rayon in the same manner as direct cotton colours were applied to viscose, *i.e.*, by the addition of Glauber's salt to the dye-bath. They possessed very good fastness properties and might be used in conjunction with existing Duranol and Dispersol colours.

Only two members of the Solacet range had been issued at the present time, but it was intended that a complete range of these colours should be available very shortly and it was anticipated that a large number of dyers would use them in preference to the existing types. Water soluble acetate rayon colours, of course, were by no means new, but as those previously introduced were acid azo dyestuffs which did not possess any outstanding fastness properties they did not make a strong appeal to dyers in this country.

AUSTRIA supplies the bulk of printing inks imported into Poland. Of total imports of printing inks into Poland for the first 10 months of 1935, which amounted to 427 metric quintals, valued at £11,120, Austria supplied 324 valued at £7,640 with second place in the trade going to Great Britain, which furnished 60 metric quintals, valued at £1,980.

Chemical Industry Finance

By S. HOWARD WITHEY, F.C.I.

BEFORE debiting depreciation and maintenance the audited accounts of the Calico Printers' Association, Ltd., showed a profit of £556,894, but the net profit balance proved to be only £42,969, necessitating the transfer of £100,000 from the reserve in order to meet the preference dividend. The sum of £200,000 was transferred from depreciation account to the capital reserve, bringing that fund up to £1,000,000, while the general reserve now amounts to £700,000. Fixed assets, comprising property, plant, machinery, etc., were shown on the balance sheet at £4,882,182, while the stocks were valued at £965,302 and the book debts at £1,026,074.

Artificial Silk

During the financial year to the end of June last, the productive plant of Kirklees, Ltd., manufacturers of artificial silk by the viscose process, was operated at full capacity, assisted by the employment of new debenture capital, and despite price cutting the margin of gross profit showed a satisfactory increase. After charging increased expenditure on maintenance, and debiting general expenses, interest, and depreciation, the net profit worked out at £15,021, which compares very favourably with £1,177 realised during the preceding twelve months. This enabled a dividend of 3 per cent. to be distributed, and the carry forward to be raised from £3,774 to £11,295. After deducting depreciation the company's property was shown on the balance sheet at £316,369, and the current assets consisting of stocks, book debts and cash totalled £105,279. The issued share capital is £250,000 in the form of ordinary shares of 5s. denomination. Since the report there has been an issue of £25,000 5½ per cent. first mortgage debenture stock to rank with the outstanding £100,000 stock.

The audited accounts of Burt, Boulton and Haywood, Ltd., chemical manufacturers, timber merchants, tar distillers, and creosoters, covered the twelve months' operations to the end of June last, and disclosed a trading profit of £91,678. After making allowance for losses sustained by subsidiaries and contingencies, and charging directors' fees, debenture service, depreciation and income tax, the result was a net loss of £5,418, necessitating the transfer of £25,000 from the reserve in order to pay a dividend of 4 per cent. on the ordinary capital and a corresponding distribution on the workers' certificates. At the balancing date the current assets amounted to £544,266, made up of investments, stocks, book debts and cash, while creditors totalled only £163,521. The share capital of £669,790 comprises £150,000 in the form of 7 per cent. cumulative preference £1 shares, and £519,790 in ordinary £1 shares. The first mortgage debenture stock is redeemable at par on January 1, 1939, at the company's option.

Explosives and Chemical Products

During the financial year to June last, a net profit of £15,939 was realised by Explosives and Chemical Products, Ltd. This figure compares with £15,001 shown in the previous account, and the dividends on the ordinary shares and the deferred shares were maintained at 16⅔ per cent., tax free, and 5.9124d. per share, tax free, respectively, leaving a credit balance of £32,882 to be carried forward, as against £27,074 brought in. This company was registered in 1905, and has an authorised capital of £100,000.

The audited accounts of the Eastern Chemical Co., Ltd., were made up to the end of March last, revealing a profit of £221, which figure was arrived at after allowing £238 for depreciation. During the preceding year this company sustained a loss, but the deficit has now been reduced to £51,471. As manufacturers of sulphuric acid and other chemicals used in the textile trades and in agriculture the company was registered in 1913 and has an authorised capital of £100,000.

The trading profit of £74,227 made by the British Cyanides Co., Ltd., during the twelve months ended September last, compares with £73,847 for the preceding fifteen months which was equivalent to £59,078 per annum. After debiting general expenses and depreciation, etc., the balance of net profit was £26,674, representing an increase of about 27 per cent., and the declaration of a dividend of 8 per cent. on the ordinary shares absorbed £24,684, leaving a credit of £2,797 to be carried forward as against £2,288 brought in. The fixed assets of the company and its subsidiaries were valued for balance sheet purposes at £280,211, and goodwill figured at £15,156, while the current assets amounted to £173,569 against creditors for £35,266.

A satisfactory recovery was reported by the directors of Bowater's Paper Mills, Ltd. During the twelve months to September last, the trading profit amounted to £178,316, which compares with £132,662 for the previous year, while at £91,768 the balance of net profit registered an advance of no less than £40,059. After meeting an ordinary dividend of 5 per cent. there remained £38,833 to go forward. According to the balance sheet, property and plant are worth £1,774,662, while the floating assets total £627,377. The share capital of £1,300,000 consists of £500,000 in the form of 6½ per cent. preference £1 shares; £300,000 in 7½ per cent. participating preference £1 shares, and £500,000 in ordinary £1 shares.

Paper Makers' Profits

The final figures of Bowater's Mersey Paper Mills, Ltd., covered the nine months' operations to the end of September last. The trading profit for that period was £114,550, equivalent to £152,680 per annum, and after debiting debenture interest and depreciation the net profit proved to be £57,550, subject to £32,500 for premiums on the redemption of 6½ per cent. debenture stock. After meeting the preference dividend of 5½ per cent., the account showed a credit of £8,368 to be carried forward, as against £3,943 brought in. The share capital of £1,000,000 consists of £500,000 in preference shares and £500,000 in ordinary shares, all of £1, and there is an issue of 4½ per cent. debenture stock.

Increased activity in the iron and steel industry, side by side with the benefits of the capital reorganisation scheme, are reflected in the figures submitted by Dorman, Long and Co., Ltd. The demand for the company's products necessitated the operation of additional units of plant, and the trading profit of £788,605 compares very favourably with £420,510 for the previous year. After adding dividends and sundry income, and charging directors' fees and pension payments, there was a profit of £825,173, enabling a dividend of 6½ per cent. to be paid on the non-cumulative first preference shares, and £200,000 to be placed to reserve.

IN addition to the range of portable spray painting plants manufactured by A. C. Wells and Co., Ltd., they have a variety of units which can be coupled to existing air mains. These compose an air filter to eliminate dust, oil and moisture, length of air hose, pressure solution container, capacities one to fifty gal., fluid hose and spray guns. The spray guns can be supplied with paint cups up to one quart capacity for use with small quantities of paint. The No. 4 gun is fitted with the cup mounted above the gun, and the No. 4A gun with a cup below; the choice is immaterial and depends on the operator's selection. Limespraying and all varieties of works maintenance can be carried out effectively by these spray guns. Speed, economy of material and quality of finish are the chief advantages of the spray method.

Modern Fatty Oil Processes

A Lecture to the Hull Chemical and Engineering Society

A SURVEY of modern fatty oil processes was given by Mr. T. Andrews in a lecture delivered to the Hull Chemical and Engineering Society on January 14.

In the last decade, said Mr. Andrews, a very noticeable phenomenon in the oil trade has been the number of earths which have been offered, each to perform its own specialised work. The result is that, to-day, the activated earth has proved its worth and, what is more, from the scientific point of view has proved that different colourings in the same base—oil—are far from being similar compounds. In fact, the activated earths to-day range from highly acidified bodies through neutral, to alkaline bodies, and it is part of the work of the oil-man to-day to find the most suitable earth for his work.

With regard to the activated carbons we have not yet arrived at the same satisfactory position. Recent samples of activated carbon have held out much promise. At the same time it would be of great assistance to the oil world in general if manufacturers would give some better guidance to the user than is generally contained in their nomenclature. For example, we can pick up a certain activated earth and know that it does its best work with palm oil, soya oil, cotton oil or some other oil and know that it is specially prepared for this work, but there are too many symbols of the "Excelsior" type attached to the carbons which may be excellent trade names but exasperate the poor oil chemist whose whole endeavour is to find out—in the least possible time—whether it is good for a particular oil or not.

Increased Interest in Vitamins

Since 1926, perhaps nothing has happened to appeal more to the public than the rise in interest in the vitamins. Generally speaking, the bulk of the people have come to realise the value of these, and with the public's educational improvement in this matter certain oil chemists have been forced to see that their products conform to a vitamin potency test. Particularly is this the case with the fish liver oils. Vitamins A and D are usually associated in these oils and vitamin E in the oils of the various seed-germs.

One of the first important points that the oil chemist discovered was that alkali neutralisation, as such, did not materially effect the vitamin potency of some liver oils (viewed from the standpoint of the original weight of oil before neutralisation). On the other hand, other factors in a neutralisation process did materially influence the potency. Thus oil neutralised at very low temperatures, preferably with the exclusion of all air, gave a value to the neutral oil which compared favourably with that in the crude oil after allowances for the free fatty acid content had been made.

Treatment of Cod Liver Oil

Drummond and Hilditch, in the Empire Marketing Board's publication No. 35 published in 1930, recommend in the case of cod liver oil that no refining other than demarginating should be undertaken, and if any other were necessary that it should be restricted to low-temperature agitation with fuller's earth and/or charcoal. Such a statement only five years ago was not only warranted but incontestable. Some years ago, however, it was suggested that, if neutralisation of oils were carried out in vacuo, it should be possible to carry the dehydration of the soap down to the point at which it could be filtered off from the neutral oil. The process as then put forward had, as its object, the saving of the neutral oil lost in the soap-stock. The method never had the prominence it may have deserved, partly because of the extra technical control it involved and partly because of the extra cost, but chiefly because acid oils were practically as valuable as crude oils.

In carrying out a series of experiments it was found that while it was possible to preserve the vitamin content of an oil treated with alkali at low temperatures, even moderately high temperatures destroyed some of this content. In particular, vitamin "A" is known to be destroyed in oils at moderately high temperatures. Therefore, if saponification were to be undertaken it must be at low temperatures. This led to the re-introduction of the vacuum neutralisation process and incidentally to the introduction into refining practice of apparatus for obtaining very low absolute pressures (within 2 mm. of mercury of absolute zero) on a commercial scale.

Water in Soap

On looking up the vapour pressures of water one finds that, corresponding to 2 mm. of absolute pressure, water has a temperature of -10° C. In other words, if it were possible to supply ice at -10° C. with sufficient heat to supply the latent heats of fusion and evaporation, the ice would evaporate without passing through the liquid phase at a 2 mm. absolute pressure. Allowing for the fact that the water in soap at a certain point is loosely combined—probably as water of crystallisation—and would therefore require a certain amount of energy to break down the combination, it should be possible to dehydrate the soap at a little higher temperature than -10° C. at 2 mm. absolute pressure. It is not necessary to work at as low temperatures as this and, in fact, normal atmospheric temperature is low enough for the dehydration.

Therefore, having established the fact that the vitamin potency was not detrimentally altered by caustic neutralisation, and that dehydration could be effected at low temperatures the solution to the problem of employing low-grade liver oils for the manufacture of high-class medicinal oils, richer in vitamins than the original oil, was found.

This method, with a modification, has been patented by E. Merck and Co., of Darmstadt (Brit. Pat. 434,432), for the treatment of tunny fish liver oil. This oil can be prepared from salted tunny fish livers and is a dark brown, evil smelling oil, but it is rich in vitamins. Allowing for the average fatty acids in the oil the inventors claim that after neutralisation the oil contains approximately three times the vitamin potency of the crude oil. In a vacuum pan at low temperature the oil is saponified with 2.N.alcoholic potassium hydroxide, together with water, an excess of the reagent being used. The oil layer is removed by a solvent until the chemical tests for vitamins give a neutral reaction and the solvent removed from the oil again under vacuum. As might be expected from a neutralisation process of this nature, the colour, smell, taste and viscosity are all improved.

Novel Procedure

The rather abnormal procedure of neutralising and deodorising an oil in the seed before extraction has been tried and it has been found possible to neutralise and deodorise soya oil, in the meal, before extraction. It will be obvious that such a procedure is only possible provided that the free fatty acids and volatile components are distilled under such conditions that the seed can exercise no ill-effect on the oil.

Much less acid washing for low-grade fish oils and linseed oil is now carried out than formerly, since it is found that with modern activated earths much better results can be obtained by acid refining and bleaching than by acid washing. To-day the fear of sulphonation with sulphuric acid is practically extinct, and instead of relying on acid washing simply and solely as a method of removing coagulatable unsaponifiable matters the modern chemist prefers to acid refine and bleach with a suitable earth, thus getting rid of the unsaponi-

fiables and colour at one operation. In addition, the middle layer oil loss in the older washing process gave a greater cost per ton than the losses due to the filtering agent in the newer process.

The greatest commercial application in the oil trade was the steam distillation process of deodorising. This method is still universally adopted in the manufacture of edible oils, and the only modifications in recent times have been in the matters of high vacuum and lowered steam consumption. Explained briefly, there are certain very small quantities of volatile matters in oils and fats which give rise to the individual tastes and odours of the oils and fats. The deodorising system is one in which the oil is brought up to the distillation temperatures of these volatile bodies, and then sufficient injected steam is used to sweep the last traces of them out of the oil. The boiling range of these volatiles is higher than the decomposition temperature of oils at atmospheric pressure and therefore the distillation must proceed in vacuo.

In the early days we referred to the low and the high vacuum methods and thought of the low vacuum process as the one working at a vacuum of about 18 inches of mercury and the high as working at about 26½ inches of mercury. Gradually the low vacuum system dropped out and the "high" vacuum system became more or less universal, and the average working vacuum rose to 28 to 29 inches of mercury and this system has, to-day, the greatest popularity. It is well known that the mechanical action of the steam, in sweeping out the very small portions of volatiles, is greatly aided by the increased volumes the volatiles occupy at high vacua, apart from any lowering of the temperature due to the distillation taking place at the higher vacua.

The question, in high vacua work, of which is cheaper, steam or water, has not always received the study it deserves. Considering a system using 1,000 lb. of steam per hour through a deodorising system and using a very moderate water supply of 5,000 gal. of water per hour for condensing the same, we will assume that the boilers require no extra labour and that the water is sold to the plant at 8d. per 1,000 gal. The boilers are of the moderate efficiency and yield 8 lb. of steam per 1 lb. of coal. Then for the 1,000 lb. of steam 125 lb. of coal are needed. Coal costs £1 a ton at the works, so the cost of coal—ignoring all indirect charges—is 13d. per 1,000 lb. of steam, whilst the water will cost 40d., similarly ignoring indirect charges.

New Technical Books

THE DRY CLEANER'S HANDBOOK. By F. R. Baker and A. P. Anderson. Shepherd and Hosking, Ltd. Pp. 144. 3s. 6d. net.

In this handbook the authors have supplied a long-felt want for the small man who is thinking of setting up business either alone or with a partner on a very small capital. The entire range of the business is dealt with—from the best means of choosing a site down to the making of the customers' goods. A large section is devoted to dyeing; all classes of fabrics and articles are brought under discussion and faults, etc., in garments which will only be accentuated by immersion in the dyebath are fully explained. A very useful chapter deals with the art of the "Spotter" and the best solvents for him to use for removing stains. There are several clear illustrations of the various machines required, and a short description is given of each of them, also a rough estimate of the cost of installation.

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BOILER FEED WATER TREATMENT. By F. J. Matthews, B.Sc. Hutchinson's Scientific and Technical Publications, London. Pp. 256. 12s. 6d. net.

As the result of extensive research work which has been carried out on the subject of boiler feed water treatment, great changes in boiler design have taken place in recent years. These have necessitated considerable modifications in the old technique and have led to the development of new methods of treatment. While the rapid advance has proved beneficial to operators of large installations, it has only confused the small or ordinary plant operator with the wide variety of treatments. This, as the author says, is unfortunate "since the large super-pressure plants have their own chemists . . . whilst the small operating engineer usually has to worry out his problems for himself." With this point in view, the present book has been published and should fulfil its function perfectly. In it is collected in articulated form the most recent information on boiler feed water treatment and allied subjects, such as the causes of framing and priming of boilers, embrittlement of the boiler plates and the all-important subject of corrosion. Finally, there is a section on analysis, including the usual routine methods of testing required for the efficient operation of softeners, which will considerably add to the value of the book for students and chemists and will at the same time assist engineers to interpret analytical reports. The author has been particularly happy in the choice of his style and phraseology, so that even the more practical man will be able to follow the arguments relating to the problems connected with water treatment and its behaviour in the boiler. In the attempt to serve this class of reader, the treatment has not become unduly elementary to be instructive to the specialist, who will be able to gather much useful information from the text and particularly the references placed at the end of each chapter. These are quite up to date and present in every way the latest aspect on the subject in question. If any criticism can be offered it is with regard to the statements concerning limits of concentrations of constituents in feed and blowdown water. A clear statement in this respect would have added to the value of the publication. As it is, such data can only be inferred from the text, or where they are given they are not as readily accessible as they would have been in tabulated form. In view of the excellence of the book, this criticism is put forward with great diffidence and more in the nature of a suggestion that might be incorporated in another edition, which is likely to be called for with the demand that this book is certain to create.

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INSULIN: ITS PRODUCTION, PURIFICATION AND PHYSIOLOGICAL ACTION. By Douglas W. Hill, B.Sc., and Frederick O. Howitt, M.Sc. Hutchinson's Scientific and Technical Publications. London. Pp. 220. 12s. 6d. net.

The discovery of insulin has been described as one of the most important and dramatic events of the present century and there has been a vast accumulation of literature relating to its production and properties. The book by Dr. Hill and Dr. Howitt represents an attempt to give the reader a complete summary up to date of all the literature on insulin with the exception of its clinical application. The book is written in the first place for the specialist and the authors have included references to all the original communications from which they have drawn. The number of references alone must surely be phenomenal in a book of this size, for the index of authors embraces something like 1,400 names. The book is not intended primarily as a text-book, but should be regarded more in the nature of a set of notes on the problems confronting workers in the study of insulin. For this reason the authors have purposely refrained from drawing what, to them at least, sometimes appeared to be obvious conclusions. They have avoided dogmatic statements and have merely given the evidence for the different views expressed.

Making Oil from Coal

Professor Bone Suggests an Advisory Council

THE informal discussion on the economic and national aspects of the production of oil from coal at a meeting of the Institute of Fuel on February 14 resulted in a number of valuable suggestions regarding the future of the process in this country. The first part of the discussion was reported in THE CHEMICAL AGE last week (pages 163-165).

More than one speaker, in referring to Billingham, urged that a matter which might have been studied in such a large-scale research plant was that of providing lubricating oils on a large scale, the view being expressed that this was an economic possibility, but one which had not received the attention it deserved.

Attention was drawn to the point that a much smaller subsidy spent in several other directions would at least have the advantage of helping to solve the smoke problem, to which the present plant made no contribution. The whole matter, it was suggested, was another example of lack of co-ordination in fuel matters. When Mr. Churchill, as Chancellor of the Exchequer, had levied a tax on motor spirit for revenue purposes, representations were made to him that some small assistance in the development of processes for the production of smokeless fuel might be afforded by allowing the motor spirit produced thereby to be free of duty. Some difficulty had been experienced in convincing him even of the desirability of extending this preference to home-produced benzol from gasworks and coke oven processes.

Subsidies for Motor Spirit

The selection of motor spirit production as the criterion of the amount of assistance to be provided was simply on account of its convenience, and it was never contemplated, in the view of one of the speakers, that this form of assistance would be used to afford exaggerated subsidies for the sole purpose of motor spirit development, to the exclusion of the other and more important advantages which accrued from methods other than hydrogenation. Further, the amount of subsidy to which the Government was committed was wildly in excess of anything that was contemplated as sufficient to help the new smokeless fuel industries to be launched successfully. It might quite fairly be claimed by them that they were entitled to further assistance. One speaker was afraid that with regard to the oil-from-coal scheme we should eventually find ourselves in the same position as in connection with the beet sugar industry, for that was an exactly parallel case from the political point of view, which everybody appreciated to-day was a mistake; but it was difficult in practice to give it up, and the taxpayer had to pay very large sums for the employment of very few people.

On the question of national security, a speaker considered it the greatest possible mistake to lead anyone in this country to believe that any plant such as the hydrogenation plant at Billingham would give this country anything but a negligible measure of national security. It was impossible to consider establishing plant in this country for the production of our peace-time fuel needs, even apart from the economic aspects; that being so, it was absolutely impossible in war time.

Oil Prospecting in Britain

Whilst on all sides every sympathy with the coal industry and the miners was expressed, as was also the anxiety to help as much as possible, a speaker asked whether it would be suggested that, if reasonable quantities of oil were found in this country as the result of drilling operations, the Government would say that it must not be used because it would affect the coal industry. There was fairly general agreement with the view that oil storage was the only real security for national defence. One of the suggestions made was that derelict coal mines might be rendered oil-proof and used for storing oil. A question raised in connection with large underground reservoirs was that oils of different asphalt contents must not be allowed to mix. In reply to this it was pointed out that it would be necessary to use separate tanks for separate products, and that in any case it would be safer to build a large number of relatively small tanks than only one or a few very large ones.

Another problem was how far it would be necessary to provide cracking plant for the purpose of cracking the heavy oil stored. The view was expressed, however, that it could not all be stored in the form of heavy oil; heavy oil which was not inflammable would contain a very small percentage of petrol which could be produced quickly by direct distillation. Cracking was much more complicated than distilling, and units of large throughput could not be designed quickly. At the same time, it was suggested that if there were a rebate of duty to an industry engaged in cracking heavy crude to produce petrol there would be a very big industry here within a short time.

Germany's Oil Production

Questions were asked concerning oil production in Germany, and it was stated that the production of naturally-occurring crude oil there was about 10,000 tons per day. The amount of petrol made from coal and brown coal distillation in Germany last year was about equal to the increase in the consumption for that year. Further figures given suggested that by the end of 1936 Germany would be producing about 25 per cent. of her requirements in fuel oils. The difficulty, however, was to produce lubricating oils.

Finally, one speaker expressed some uneasiness as to the use which might be made of the valuable data obtained from the Billingham plant. It was imagined that the international holding company would be entitled to receive the data, but it was understood that our Government had no rights whatever in the matter. The question was therefore asked whether a position had arisen whereby data obtained at the cost of our own Government might be communicated to foreign countries with the exclusion of our own country from such participation.

Professor Bone, in a brief comment on some of the points raised in the discussion, suggested that the Institute might consider the constitution, from amongst its own body, of an advisory council which might offer its services to the Government, by discussing the problems confidentially with Government officials and giving advice based on scientific and technical knowledge.

Distillation Apparatus

A New Standard Specification

THE British Standards Institution has issued a standard specification for distillation apparatus (No. 658 of 1936). The first part specifies in detail the component parts of the apparatus. The assembly of the apparatus is next dealt with and diagrams show the assembly for each of four different types of condenser provided. The specification goes on to state that since the appropriate assembly of apparatus and detailed procedure for carrying out a distillation differs for different liquids and differs also with the object in view in carrying out the distillation, reference should be made to the appropriate British standard specification for details applicable to any particular liquid.

An appendix is given dealing with the correction of barometric readings to standard conditions. It is also stated that by making suitable choice in the assembly of the component parts specified, adequate provision can be made for a wide range of distillations.

Bituminous Road Mixtures

Standard Methods for Sampling and Examination

THE British Standards Institution has recently published British standard methods for the sampling and examination of bituminous road mixtures. These methods have been drawn up to provide a standard procedure for the examination of bituminous mixtures (asphalt and tarmacadam) used for road surfacing. They are appropriate for use in connection with the existing British standard specifications for hot process rolled and mastic asphalt, for asphalt macadam, and for asphalt road surfacing by the cold process.

Fully detailed procedures are laid down for the taking of samples, both before the mixtures are laid, and also from the finished road surface. The methods of examination cover a large majority of the methods used for the normal testing of road mixtures, including specific gravity, content of bituminous matter, water content and mineralogical identification of the aggregate. Certain of these procedures would normally be adopted as routine tests, to ascertain to what extent the material being laid is in conformity with the specifications of the engineer. In addition, there are methods which would not in general be carried out in the case of every contract, but which would be suitable for application where a more detailed study of the road mixtures or of the resulting road surface is required.

Certain of the tests on the road surface may be employed either immediately after the material has been laid, or alternatively after an interval of some months or years in order to obtain information as to the behaviour of the road under traffic or weather conditions or to enable the reason for the failure of any particular section of a road to be ascertained.

Copies of this Specification (No. 598—1936) may be obtained from the Institution, price 3s. 8d., post free.

Chemical Production in Japan

Prospects of Expansion During 1936

THE large gains made in production of many chemicals in Japan evident the past few years continued in 1935, and plans are made for further expansion in output in 1936. Figures published monthly for eight of the more important chemicals show gains in every instance, with the exception of aniline, but these figures are incomplete, excluding the production of two large producers of bleaching powder, and the production of caustic soda for their own use by some companies. Increases in production ranged from 10 per cent. for superphosphate to 57 per cent. for cyanamide, the percentage increases in other items amounting to 18 for ammonium sulphate, 22 for soda ash, 16 for bleaching powder, and 29 for caustic soda. Production in metric tons for the first nine months of 1935 were: superphosphate 909,270, ammonium sulphate 684,400, cyanamide 146,964, soda ash 144,843, bleaching powder 51,944, caustic soda 154,554, and aniline 2,290. The continued activity of the explosives, dyestuffs and pyroxylin plastics industry stimulated the demand for nitric acid and caused a marked increase in production, with an estimated output for 1935 of 47,000 tons.

An agreement was reached between the Japan Sulphate of Ammonia Manufacturers' Association and a representative of European nitrogen producers covering trade for 1936 and 1937; the Showa Fertiliser Co. has completed a plant at Kawasaki, near Tokyo, and conducted trial operations; the Sumitomo Chemical Industry Co. has an elaborate plan to expand its production of chemicals, output of potassium carbonate, urea, ammonium chloride, ammonium carbonate and trisodium phosphate to be increased, while other products to be made in 1936 include methanol and formalin; a number of companies were reported to be perfecting plans to manufacture dyestuffs; and it was said that Toyo Nitrogen would manufacture benzol, erecting a plant for the purpose at a cost of 1,000,000 yen.

Medicinal Chemicals

New Products Replace Galenical Preparations

SUCCESSIVE British Pharmacopoeias show an increasing number of medicinal chemicals in the place of crude drugs and galenical preparations, said Dr. F. L. Pyman, of Boots Pure Drug Co., Ltd., in a lecture delivered before a joint meeting of the Society of Chemical Industry and the Institute of Chemistry at Bristol on February 17. In the field of vegetable drugs, the isolated active principles, in many cases alkaloids, now completely replace the crude drug.

Modern developments of biochemistry, said Dr. Pyman, have also led to the introduction into medicine of the active principles of various animal organs, and in this connection insulin and the liver principle, valuable in the treatment of pernicious anaemia, are of particular importance. Chemicals have also been introduced into medicine through investigations of the relation between chemical constitution and physiological action, and, in particular, studies in the field of chemotherapy, as instanced more especially by the work of Ehrlich, have led to the discovery of new medicinal chemicals found in modern Pharmacopoeias.

Tung Oil for Paints

Revised British Standard Specification

THE British Standards Institution has just issued (No. 391 of 1936) a revision of the specification for tung oil, which first appeared in 1929. A review of this specification was undertaken some time ago in the light of modern developments and the latest knowledge on the subject, with the result that several important modifications and additions have been made which include a revised method for the determination of unsaponifiable matter based on the method developed by the Society of Public Analysts.

In addition, consideration has been given to the existing heat test in relation to other quantitative methods recently developed for assessing the efficiency of the oil, and a new test for the determination of polymerisable matter has been included as an alternative. This method, which for the present is to be regarded as a subordinate test, has been included for the purpose of gaining wider experience of its application in general practice, and, in the light of such experience, the committee hopes to be in a position to adopt it as a mandatory test when the specification is next revised.

In several instances the limits have been modified, and the details of the tests after careful examination have been brought, particularly from the standpoint of accuracy and reliability, into line with up-to-date technique.

Whilst this revised specification is intended to apply to tung oil of Chinese origin, which oil is derived substantially from the seed of the species *Aleurites fordii*, the committee has noted the fact that the production of tung oil from seeds of the related species *Aleurites montana* is being extensively developed within the Empire, and announces that a further British Standard Specification for this material will follow in due course.

MUCH interest is now attached to the production of diazo-type prints of engineers' drawings, architects' plans, etc. Prints produced by this process are stable to light without the necessity of using a fixing bath or of washing, which is the drawback to ordinary photographic prints. "Z.A.," a new chemical placed on the market by Whiffen and Sons, Ltd., is used for the preparation of solutions for the coating of paper to be used for diazo-type prints. "Z.A." is para-diazo-diphenylamine sulphate; it is a yellow light-sensitive substance packed in jars in the form of a paste. The salt is applied to the paper at a concentration of 2 per cent. together with 1-2 per cent. tartaric acid and a small quantity of gelatine. Various developers can be used giving prints of different colours.

Society of Chemical Industry

Lord Leverhulme to be Next Year's President

AT the annual joint meeting of the Liverpool and Manchester Sections of the Society of Chemical Industry at Liverpool University on February 21, when the Jubilee Memorial Lecture on "Metals in the Chemical Industry" was delivered by Dr. C. H. Desch, Mr. W. A. S. Calder, the president, announced that Lord Leverhulme had consented to take office as president of the Society for the forthcoming year, when the annual meeting is to be held in Canada. The president also announced that the Society had sent a letter of sympathy to the King and Queen Mary on the death of King George V, who was patron of the Society.

Professor C. O. Bannister, chairman of the Liverpool Section, presided and announced that the Lord Mayor of Liverpool, in connection with the annual meeting in July, had invited the Society to a civic reception on July 7.

Mr. Calder, in proposing the vote of thanks to Dr. Desch at the close of his lecture, remarked that possibly the Coronation might have some effect on the arrangements for the meeting in Canada.

Adhesion and Bituminous Road Materials

A PAPER of interest to those concerned with the construction of roads both from a theoretical and a practical standpoint was read by Dr. A. R. Lea, of the Road Research Laboratory, before a joint meeting of the London Section and the Plastics Group of the Society of Chemical Industry on February 3. The title of the address was "Adhesion in Relation to Bituminous Road Materials."

At the outset, Dr. Lea referred to the general characteristics of adhesives and adhesive action. He described a method for measuring the wetting properties of various road binders and oils in the presence of water. It had been found, he said, that in the experimental conditions described tars had better wetting properties than a residual bitumen of similar viscosity. Results had been obtained with various types of stone which showed that there was little difference in the wetting properties of tar towards the different kinds of stone used in road construction when the stone surface was highly polished and previously wet with water.

Qualitative tests supported the finding that surface texture, roughness and porosity of the stone were the most important properties of the stone affecting the adhesion of the binder. Dr. Lea gave a description of a "jar" and a "plate" method for detecting the displacement of binder by water from stones as used in road construction. If weathering of the binder occurred before contact with water the drying properties of the binder would have a big influence on its displacement. In speaking of the undesirability of using wet stones for the surface dressing of roads, Dr. Lea described a method for oil treating stones which allowed complete wetting of stones such as porous gravels by tar in the presence of water.

American Section: Economics of Synthetic Rubber

A MEETING of the American Section of the Society of Chemical Industry was held on February 21 at the Chemists' Club, New York. The guest speaker was Mr. E. R. Bridgwater, of E. I. du Pont de Nemours and Co., Wilmington, Delaware, who spoke on the "Economics of Synthetic Rubber." Mr. Robert J. Moore was the chairman.

Mr. Bridgwater said that to physicists and chemists the synthesis of rubber-like materials was an intriguing scientific problem, because until recently no one had succeeded in producing a highly polymerised product having the mechanical properties of natural rubber and a similar structure as revealed by X-ray analysis. To the political heads of European nations synthetic rubber was a prime military necessity because of the probability of imports of raw materials being shut off in the event of war. The manufacture of synthetic rubber was watched by owners of crude rubber plantations who felt that it was a threat to their profit-making plans. But these interests did not justify the substitution of synthetic rubber "Duprene," made by the polymerisation of chloroprene, for natural rubber produced cheaply and efficiently by the rubber tree. Rather, the justification lay in the fact that it was more resistant to oxidation, to oils and to chemicals which were harmful to natural rubber and hence better adapted to many industrial uses.

Mr. Bridgwater studied at the University of Akron and also at the Massachusetts Institute of Technology. During the war he served in the Chemical Warfare Service and Bureau of Mines and subsequently was employed as chemist by the B. F. Goodrich Co.; later in the same capacity by the Firestone Tyre and Rubber Co. He has been with du Pont for twelve years. His first assignment there was to organise a rubber laboratory for the study of accelerators and other synthetic organic chemicals as compounding ingredients for rubber. For the past four years he has been manager of the rubber chemicals division of du Pont. His experience in the field has given him valuable knowledge of synthetic rubber and its applications.

Indian Chemical Notes

Water Hyacinth Research

WATER hyacinth is a pest in Bengal and, with a view to discovering its commercial possibilities, Dr. H. K. Sen, of the Calcutta University College of Science, has done some research work the results of which are now available. It is stated that Dr. Sen has been able to isolate potassium chloride on a semi-commercial scale. Other matter has also been obtained, which is being increasingly used for the manufacture of synthetic plastics, acetic acid and acetone, the two important solvents used in lacquer and other industries. The residue left approximates to about 40 per cent. of the weight of the air-dry hyacinth and has been converted into pressed fibre goods of highly attractive character. It is calculated that 100 maunds of air-dried water hyacinth yield four and a half maunds of furfural, one and two-thirds maunds of acetic acid, one and three-quarter maunds of acetone and ten maunds of potassium chloride. Considering the commercial aspects of the results, it is considered feasible to erect the necessary plant. It is also reported that Mr. E. F. Watson, superintendent of the Governor's estates, Bengal, has also been able to make a valuable compost from water hyacinth by treating it with molasses. This process preserves the valuable ingredients of the molasses and gives the soil the humus it needs with a large amount of added nitrogen.

Tannin Extraction

The small Indian State of Bhor in the Maratha country is proposing to start a factory for the extraction of tannin from myrabollams which grow in its territory in large quantities. At present in the whole of India there is said to be only one such factory, while the scope is very large, as India imports at present large quantities of tannic acid. All conditions are said to be favourable in the Bhor area. There is undoubtedly an expanding market, if the use of tannin extract is popularised among the native tanners who at present carry on the tanning of hides and skins with the old and crude process. If tannic extract were used it would achieve better results in a comparatively short period. The extract will also find a market in the textile industry, and in future even foreign markets may be tapped.

Personal Notes

MR. ANDREW DICKS, one of the oldest chemical workers at Widnes, died last week at the age of 81. He had over 50 years' service with the United Alkali Co. at the Widnes alkali works.

The marriage arranged between Miss NAN MCGOWAN, younger daughter of Sir Harry McGowan, chairman of Imperial Chemical Industries, Ltd., and Mr. Dermot-Ralph Daly, of the Scots Guards, it is announced, will not take place.

SIR HENRY ARTHUR COLEFAX, K.C., an authority on patent and trade mark law, died from pneumonia at his home, Argyll House, Chelsea, London, aged 68, on February 19. In addition to specialising in patents, Sir Arthur was a trained scientist and had published many papers on chemistry. He gave valuable assistance during the war to the Admiralty and the Ministry of Munitions.

MR. ROBERT TULLIS, a well known Scottish paper maker, has died at his residence, Strathenry, Leslie, Fifeshire. For many years he was associated with his uncle, founder of the firm of Tullis, Russell and Co., Ltd., paper manufacturers, Markinch, in which he retained an interest until he retired in 1924. He was also associated with Robert Tullis, Junior, Rothes Bleachfield, Markinch, of which his youngest son is managing director.

MR. CECIL JOHN TURRELL CRONSHAW, managing director, Dyestuffs Group of Imperial Chemical Industries, Ltd., is among the candidates recommended for election on March 2 as Fellows of the Royal Society of Edinburgh.

MR. C. C. DUNCAN, B.Sc., F.I.C., public analyst for Salford, has been appointed county analyst for Worcestershire. He is a member of the Society of Public Analysts, Society of Chemical Industry, and American Chemical Society.

MR. ALEXANDER STEVENSON, manager of the North British Distillery, Edinburgh, has died at his residence, at Loanhead, at the age of 76. He celebrated his jubilee as manager of the distillery last month and was present when the first turf was cut and the foundations laid for the buildings.

SIR ERNEST BENN, chairman of Benn Brothers, Ltd., proprietors of THE CHEMICAL AGE, spoke in support of the appeal of Sir William Perring at the annual dinner of the Furniture Trades' Benevolent Association on Tuesday evening. After complimenting the Association on the fact that only 10 per cent. of its subscriptions was absorbed by expenses, he said he found that a trade with a turnover of over £300,000,000 supported a charity with a reserve of only £12,000, not a wonderful figure for the great furnishing industry.

Continental Chemical Notes

Roumania

THE IFAR COMPANY has been established in Bucharest for the production and sale of pharmaceuticals and cosmetic products.

Russia

AN EXPERIMENTAL PLANT for extraction of metallic antimony from ores in South Kasakstan has been erected and other antimony ores with a high mercury content are under examination in the same locality.

Hungary

A FACTORY FOR THE PRODUCTION OF ACTIVE CARBON from native raw materials is being constructed in Budapest, by the E. Sauerwald concern.

ACCORDING TO A BUDAPEST REPORT negotiations are proceeding with a view to the erection of a wood distillation plant near Papa in Western Hungary. The enterprise will enjoy the benefit of the State preferential schemes for six years. An annual production of 3,000 to 4,000 tons of wood charcoal is anticipated as compared with the total Hungarian consumption of 40,000 tons.

Germany

ACID-RESISTANT CARBON LININGS for chemical plant, made by a process resembling that used in the production of carbon electrodes, have attracted considerable attention in the German chemical industry, reports Dr. F. Hoffman in the "Chemische Fabrik" (February 19). Selected carbonaceous material in the comminuted form is calcined and pulverised in the absence of air; the powdered material is incorporated with a binder (tar) and moulded in hydraulic presses. Finally, the sheets are again exposed to intense heat to carbonise the binder and eliminate volatile ingredients. These linings were tested out in cellulose pulp digesters in contact with hot 70 per cent. sulphuric acid for several hours, and it appears that they suffered slight loss in weight at the commencement of treatment only. Linings of a ceramic material tested under identical conditions underwent continuous loss in weight.

France

THE COAL LIQUEFACTION PLANT of the Compagnie de Bethune which operates by the Vallette process has now been in use for two months. Another factory in Lievin has now been completed and will shortly be producing liquid fuel by the Audibert process. Finally, work on a plant to operate the Fischer process has been commenced by the Courriers Kuhlmann concern.

Sweden

A NEWLY-FORMED holding company has acquired from Aktb. Avenska Handelbanken, Stockholm, one of the leading commercial banks in Sweden, the majority of the shares in Reymersholms Gamla Industri Aktb., Halsingborg. Reymersholms Gamla Industri Aktb., established in 1910, is capitalised at 4,000,000 crowns and manufactures alum, copper, sulphuric, hydrochloric and phosphoric acids, purple-ore, purple-ore briquettes, aluminium sulphate and sodium sulphate. About 600 workers are employed and the output in 1933 was valued at approximately £300,000. The company paid a 5 per cent. dividend in 1934, the first for several years.

Italy

PYROLUSITE DEPOSITS with an average manganese content of 58.8 per cent. are being exploited in the vicinity of Pisa.

ACCORDING TO A MILAN REPORT, methane is in experimental use as a propulsive agent on the Salsomaggiore-Fidenza tramway route.

STATISTICS PUBLISHED BY THE MINISTRY OF CORPORATIONS show that the Italian annual production of nickel salts is less than 10 tons, the greater part of which is represented by nickel sulphate. This figure compares with an importation of 240 tons of nickel sulphate alone in 1934.

A LARGE COKING PLANT WHICH HAS BEEN ERECTED near the harbour of Savona, at a total cost of 50 million lire, is sponsored by the Montecatini and Italgas concerns. The share capital of the Italgas has recently been increased from 288½ to 366 million lire with the object of modernising and extending a number of plants. Efforts are to be made to render the country independent of coke imports as far as possible.

From Week to Week

THE FARADAY SOCIETY will hold a general discussion on "Disperse Systems in Gases; Dust, Smoke and Fog" in the Chemistry Lecture Theatre of Leeds University from April 20 to 22.

A RECENTLY-PUBLISHED CENSUS REPORT for the State of Sao Paulo placed production of carbon bisulphide during 1933 at 2,004 metric tons. Output of industrial acids (details not shown) was reported at 8,171 metric tons.

THE "BULLETIN OF THE IMPERIAL INSTITUTE" is now being published direct from the Imperial Institute, and all communications should be addressed to the Institute at South Kensington, London, S.W.7.

AFTER A DELAY OF OVER FOUR MONTHS a start has now been made with the £49,000 Shotts sewage and drainage scheme. The delay was caused through the refusal of the unemployed to accept payment at 1s. 0½d. per hour and demanding instead 1s. 2d. per hour. The work is now going ahead at the original rate offered.

THE "DAILY MAIL" IDEAL HOME EXHIBITION will be held at Olympia from March 24 to April 18. Among the exceptional exhibits will be reproductions of an undergraduate's rooms at Brasenose, a cell in a Benedictine Monastery and are art student's attic studio in the gay Latin quarter of Paris.

INCREASED ACTIVITY IN THE CANADIAN MINING INDUSTRY last year was responsible for new hydro-electric power development in many parts of Canada. Of the new installations, the principal additions serving the mining industries took place in the Yukon Territory and in the province of British Columbia, Manitoba and Ontario.

A NEW COMPANY, Rice, Steele and Co., Ltd., has recently been formed in the Irish Free State to carry on the business of druggists, drug merchants and manufacturers, drysalters, opticians, chemists, etc. It is a private company with a nominal capital of £5,000 in £1 shares. The first directors are F. H. Steele and G. Rice, North Lotts, Dublin.

BY THE END OF THE YEAR the Modderfontein dynamite factory of African Explosives and Industries, Ltd., a company in which Imperial Chemical Industries jointly with De Beers Consolidated Mines, Ltd., holds a controlling interest, will be the biggest dynamite centre in the world. Over £1,000,000 is being spent on extensions. A virtual doubling of output has been decided upon, and, when completed, the extensions will enable the company to produce 1,600,000 cases of dynamite annually, or 40,000 tons in weight, chiefly used for mining purposes. In addition, the company's Cape factory produces 1,000,000 cases annually.

A NEW PROCESS FOR PRODUCING OILS FROM COAL was demonstrated in London on February 20. The new process is claimed to produce petrol, kerosene, and crude oil to exact specification and superior to any on the market to-day at a cost which will not only compete with the cost of imported oil but is actually cheaper than oil could be taken from the ground even if it were found in an indigenous state in England. The yield of oil from the Freeman transformation process is in proportion with the quality of coal used and varies from 120 gallons of oil per ton from a North Wales coal to 32 gallons or lower with soft bituminous coal. The process will also work with the shales, which give 44 gallons of oil per ton, from which it is possible to obtain a lubricating oil.

A REPRESENTATION HAS BEEN MADE to the Board of Trade under Section 10(5) of the Finance Act, 1926, for the exemption from Key Industry Duty of a cinematograph camera capable of producing, simultaneously, identical exposures upon three separate films, together with its sound-deadening cover, stand and motor; an optical projection apparatus adapted for producing a combined image in colour from three separate negative cinematograph films; and an optical projection apparatus, incorporating register control devices, adapted for printing matrices used in the production of cinematograph film in colour. Any communication should be addressed to the Principal Assistant Secretary, Industries and Manufactures Department, Board of Trade, Great George Street, S.W.1, not later than March 17. A similar representation has been made regarding glyceryl stearic esters. In this case the latest date for receiving communications is March 18.

AT THE GERMAN MOTOR EXHIBITION, which opened in Berlin on February 15, the I.G. Farbenindustrie made an announcement on the progress made in its work in recent years with regard to the production of synthetic rubber. In Germany, this synthetic rubber is called Buna and has no connection with the rubber made from methyl during the war. Buna has been developed, at considerable cost, since 1926, from butadien, a product made from lime and coal as primary raw materials. Buna rubber, the company states, has in some respects better qualities than natural rubber, *e.g.*, a greater resistance to age, to temperature, and to wear and tear. The I.G. Farbenindustrie announcement received confirmation by Herr Hitler when he opened the exhibition. The cost of production of Buna has never been stated. It has, however, been estimated in financial circles that the cost of synthetic rubber was at least three to four times the cost of natural rubber.

IT IS REPORTED that South African Alkali, Ltd., produced 2,510 long tons of soda ash in the year ended June 30, 1935, of which 1,703 tons were from brine and 807 from trona.

THE SAFE USE OF EXPLOSIVES was the subject of an address by Mr. J. E. Lambert, mining engineer to Imperial Chemical Industries, to members of the South Wales and Monmouthshire branch of the National Association of Colliery Managers last week.

THE WASHINGTON CHEMICAL CO., Co. Durham, has disposed of its gas department, comprising plants, mains and stock to the Sunderland Gas Co. As soon as negotiations are finally settled, the Sunderland Gas Co. will supply gas to the Washington area.

THE FINSBURY TECHNICAL COLLEGE OLD STUDENTS' ASSOCIATION holds its annual dinner at the Trocadero Restaurant, London, on March 21, under the chairmanship of Mr. L. St. L. Pendred. The hon. secretary, Mr. F. R. C. Rouse, 15 Clifton Gardens, Golders Green, N.W.11, will be glad to receive early applications for tickets.

W. B. DICK AND CO. (HOLDINGS), LTD., 26 Grosvenor Gardens, S.W., have increased their nominal capital by the addition of £599,000 beyond the registered capital of £100. The additional capital is divided into 325,000 redeemable cumulative preference shares of £1 each, and 549,800 ordinary shares of 10s. each. The company was converted into a public concern on February 13.

THE ANNUAL DINNER AND DANCE of the London Section of the British Association of Chemists will be held at the Waldorf Hotel, Aldwych, on March 7, at 6.30 for 7 p.m. Tickets, price 10s. 6d. (including gratuities but not wines), may be obtained from the general secretary, British Association of Chemists, Empire House, 175 Piccadilly, London, W.1.

IT IS REPORTED THAT VITAMIN C, the anti-scurvy vitamin generally associated with oranges and lemons, has been isolated from the common dog rose, at the Vitamin Research Institute of the Commissariat of Food Industry in Leningrad. It is now being produced there at the rate of six hundred doses per day and is used in large quantities by the dairy products combine in Leningrad, for putting extra vitamins into its products.

AFTER TWO YEARS OF EXPERIMENT the use of snake venom to stop bleeding and so save life in cases of hæmophilia has been proved to be successful. One of the largest firms of manufacturing chemists will shortly place the venom on the market so that it can be obtained readily by general practitioners. It will import the snakes (Russel's Viper) from India and a trained keeper will tend them in the firm's own snake-house. Hitherto the venom has been in regular use for nearly a year in the dental department of St. Bartholomew's Hospital, to hasten the clotting of blood both for people with hæmophilia and those with normal blood.

A NEW FORM OF "DOPED" PETROL is being supplied to aero-engine manufacturers and arrangements are being made by the Asiatic Petroleum Co., Ltd., for its production in quantities sufficient to supply all that will be needed by British aviation when engines fit to use it have been produced. The "dope" used is iso-octane, a derivative of petroleum. Its function is to prevent detonation, and so to allow more power to be obtained from a cylinder of a given capacity either through higher supercharging or through higher compression ratios. The new fuel has already been shown to be capable of raising engine output by 30 per cent. Until recently iso-octane was produced only in the laboratory and its cost made its general use impossible. It is now to be made in small commercial plants and if the demand arises refineries for large-scale production may be equipped. The cost of fuel treated with iso-octane will be much above that of ordinary petrol.

THE ATTAINMENT AND USES of very low temperatures is the subject of an exhibition to be held at the Science Museum, South Kensington. The exhibition will be opened by the president of the Royal Society, Sir William Bragg, F.R.S., on Wednesday, March 4, and will remain on view to the public, free of charge, for three months from March 5 until May 31. The exhibits have been devised to show how atmospheric gases are obtained in the three states of gas, liquid and solid in laboratories and on an industrial scale, particular attention being paid to the illustration of their modern uses, many of which are now familiar to everyone. An exhibition of this nature has never before been held in this country nor, as far as is known, in any other country. In addition to the exhibits already mentioned there will be sections to illustrate the methods of measuring temperatures and pressures; the storage and transport of low temperature solids and liquids; and the properties of substances at low temperatures. A unique collection of historical apparatus from all parts of Europe will be of particular interest. Many of the exhibits will be in continuous operation or may be worked by the visitor, and in cases where this is not possible there will be frequent demonstrations. In addition a series of lectures has been arranged which will be given at intervals during the exhibition. A small handbook has been prepared by Mr. T. C. Crawhall, M.Sc., A.M.I.Mech.E., an officer of the Museum, who has had charge of the arrangements for the exhibition. This book will be on sale at a price of 6d. (by post 7d.); copies may also be obtained from H.M. Stationery Office.

Weekly Prices of British Chemical Products

CONDITIONS in the general chemical market remain steady and there are no changes to report in prices this week.

LONDON.—If anything, the demand for chemicals generally during the past week has been a little easier. Prices remain firm.

MANCHESTER.—Price conditions on the Manchester chemical market during the past week have been remarkably steady pretty well throughout the range and the general undertone of the market is undoubtedly firm so far as the heavy materials are concerned. Here and there among the coal tar by-products a reactionary tendency is still in evidence, more especially in pitch and crude tar, but apart from some easiness in xylol the light sections are maintained, with, in the case of naphthalene, extremely firm price conditions still reported here. Generally speaking, heavy chemicals are moving steadily into consumption against contracts, and, to a smaller extent, against spot orders, and specifications tend to cover slightly bigger quantities. New bookings during the past week, however, have been on no more than a moderate scale.

SCOTLAND.—Business in chemicals has again been rather quiet during the week, both for home trade and export. Prices, however, continue very steady at about previous figures with no important changes to report.

General Chemicals

ACETONE.—LONDON: £62 to £65 per ton; SCOTLAND: £66 to £68 ex wharf, according to quantity.

ACID, ACETIC.—40% technical, £17 15s. per ton. LONDON: Tech., 80%, £33 5s. to £35 5s. per ton; pure 80%, £35 5s. to £37 5s.; tech., 40%, £17 15s. to £19 15s.; tech., 60%, £25 15s. to £27 15s. SCOTLAND: Glacial 98/100%, £48 to £52; pure 80%, £39 5s.; tech., 80%, £38 5s., d/d buyers' premises Great Britain. MANCHESTER: 80%, commercial, £37 5s.; tech. glacial, £50.

ACID, BORIC.—Commercial granulated, £27 per ton; crystal, £28; powdered, £29; extra finely powdered, £31; packed in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. B.P. cryst., £36; B.P. powder, £37. SCOTLAND: Crystals, £28; powdered, £29.

ACID, CHROMIC.—10½d. per lb., less 2½%, d/d U.K.

ACID, CITRIC.—11¾d. per lb. MANCHESTER: 1s. SCOTLAND: 11¾d.

ACID, CRESYLIC.—97/100%, 1s. 5d. to 1s. 6d. per gal.; 99/100%, refined, 1s. 9d. to 1s. 10d. per gal. LONDON: 98/100%, 1s. 5d. f.o.r.; dark, 1s.

ACID, FORMIC.—LONDON: £42 to £47 per ton.

ACID, HYDROCHLORIC.—Spot, 4s. to 6s. carboy d/d according to purity, strength and locality. SCOTLAND: Arsenical quality, 4s.; dearsenicated, 5s. ex works, full wagon loads.

ACID, LACTIC.—LANCASHIRE: Dark tech., 50% by vol., £24 10s. per ton; 50% by weight, £28 10s.; 80% by weight, £50; pale tech., 50% by vol., £28; 50% by weight, £33; 80% by weight, £55; edible, 50% by vol., £41. One-ton lots ex works, barrels free.

ACID, NITRIC.—80° Tw. spot, £18 to £25 per ton makers' works. SCOTLAND: 80°, £24 ex station full truck loads.

ACID, OXALIC.—LONDON: £47 17s. 6d. to £57 10s. per ton, according to packages and position. SCOTLAND: 98/100%, £48 to £50 ex store. MANCHESTER: £48 10s. to £54 ex store.

ACID, SULPHURIC.—SCOTLAND: 144° quality, £3 12s. 6d.; 168°, £7; dearsenicated, 20s. per ton extra.

ACID, TARTARIC.—1s. per lb. less 5%, carriage paid for lots of 5 cwt. and upwards. LONDON: 11½d., less 5%. SCOTLAND: 1s. 0¼d. less 5%. MANCHESTER: 1s. per lb.

ALUM.—SCOTLAND: Lump potash, £8 10s. per ton ex store.

ALUMINA SULPHATE.—LONDON: £7 10s. to £8 per ton. SCOTLAND: £7 to £8 ex store.

AMMONIA, ANHYDROUS.—Spot, 10d. per lb. d/d in cylinders. SCOTLAND: 10d. to 1s. containers extra and returnable.

AMMONIA, LIQUID.—SCOTLAND: 80°, 2½d. to 3d. per lb., d/d.

AMMONIUM BICHROMATE.—8d. per lb. d/d U.K.

AMMONIUM CARBONATE.—SCOTLAND: Lump, £30 per ton; powdered, £33, in 5-cwt. casks d/d buyers' premises U.K.

AMMONIUM CHLORIDE.—LONDON: Fine white crystals, £18 to £19. (See also Salammoniac.)

AMMONIUM CHLORIDE (MURIATE).—SCOTLAND: British dog tooth crystals, £32 to £35 per ton carriage paid according to quantity. (See also Salammoniac.)

AMMONIUM SULPHATE.—Neutral quality, 20.6% nitrogen, £7 per ton.

ANTIMONY OXIDE.—SCOTLAND: £61 to £65 per ton, c.i.f. U.K. ports.

ANTIMONY SULPHIDE.—Golden, 6½d. to 1s. 1d. per lb.; crimson, 1s. 5½d. to 1s. 7d. per lb., according to quality.

ARSENIC.—LONDON: £15 per ton c.i.f. main U.K. ports for imported material; Cornish nominal, £22 10s. f.o.r. mines. SCOTLAND: White powdered, £23 ex wharf. MANCHESTER: White powdered Cornish, £22, ex store.

ARSENIC SULPHIDE.—Yellow, 1s. 5d. to 1s. 7d. per lb.

BARIUM CHLORIDE.—LONDON: £10 10s. per ton. SCOTLAND: £10 10s. to £10 15s.

BARYTES.—£6 10s. to £8 per ton.

BISULPHITE OF LIME.—£6 10s. per ton f.o.r. London.

BLEACHING POWDER.—Spot, 35/37%, £7 19s. per ton d/d station in casks, special terms for contract. SCOTLAND: £9 5s.

BORAX, COMMERCIAL.—Granulated, £14 10s. per ton; crystal, £15 10s.; powdered, £16; finely powdered, £17; packed in 1-cwt. bags, carriage paid home to buyer's premises within the United Kingdom in 1-ton lots.

CADMIUM SULPHIDE.—5s. 3d. to 5s. 6d. per lb.

CALCIUM CHLORIDE.—Solid 70/75% spot, £5 5s. per ton d/d station in drums.

CARBON BISULPHIDE.—£31 to £33 per ton, drums extra.

CARBON BLACK.—3¾d. to 4⅞d. per lb. LONDON: 4½d. to 5d.

CARBON TETRACHLORIDE.—SCOTLAND: £41 to £43 per ton, drums extra.

CHROMIUM OXIDE.—10¾d. per lb., according to quantity d/d U.K.; green, 1s. 2d. per lb.

CHROMETAN.—Crystals, 2⅜d. per lb.; liquor, £19 10s. per ton d/d

COPPERAS (GREEN).—SCOTLAND: £3 15s. per ton, f.o.r. or ex works.

CREAM OF TARTAR.—£3 19s. per cwt. less 2½%. LONDON: £3 17s. per cwt. SCOTLAND: £3 16s. 6d. net.

DINITROTOLUENE.—66/68° C., 9d. per lb.

DIPHENYLGUANIDINE.—2s. 2d. per lb.

FORMALDEHYDE.—LONDON: £24 10s. per ton. SCOTLAND: 40%, £25 to £28 ex store.

IODINE.—Resublimed B.P., 6s. 3d. to 8s. 4d. per lb.

LAMPBLACK.—£45 to £48 per ton.

LEAD ACETATE.—LONDON: White, £36 10s. per ton; brown, £1 per ton less. SCOTLAND: White crystals, £34 to £35; brown, £1 per ton less. MANCHESTER: White, £36; brown, £35.

LEAD NITRATE.—£32 10s. to £34 10s. per ton.

LEAD, RED.—SCOTLAND: £25 to £27 per ton less 2½%; d/d buyer's works.

LEAD, WHITE.—SCOTLAND: £39 per ton, carriage paid. LONDON: £41.

LITHOPONE.—30%, £16 to £16 10s. per ton.

MAGNESITE.—SCOTLAND: Ground calcined, £9 per ton, ex store.

MAGNESIUM CHLORIDE.—SCOTLAND: £7 per ton.

MAGNESIUM SULPHATE.—Commercial, £5 per ton, ex wharf.

METHYLATED SPIRIT.—61 O.P. industrial, 1s. 5d. to 2s. per gal.; pyridinised industrial, 1s. 7d. to 2s. 2d.; mineralised, 2s. 6d. to 3s. Spirit 64 O.P. is 1d. more in all cases and the range of prices is according to quantities. SCOTLAND: Industrial 64 O.P., 1s. 9d. to 2s. 4d.

PHENOL.—6¾d. to 7¼d. per lb. to June 30, 1936.

POTASH, CAUSTIC.—LONDON: £42 per ton. MANCHESTER: £39.

POTASSIUM BICHROMATE.—Crystals and Granular, 5d. per lb. less 5%, d/d U.K. Ground, 5¼d. LONDON: 5d. per lb. less 5%, with discounts for contracts. SCOTLAND: 5d. d/d U.K. or c.i.f. Irish Ports. MANCHESTER: 5d.

POTASSIUM CHLORATE.—LONDON: £37 to £40 per ton. SCOTLAND: 99¾/100%, powder, £37. MANCHESTER: £39.

POTASSIUM CHROMATE.—6½d. per lb. d/d U.K.

POTASSIUM IODIDE.—B.P., 5s. 2d. per lb.

POTASSIUM NITRATE.—SCOTLAND: Refined granulated, £29 per ton c.i.f. U.K. ports. Spot, £30 per ton ex store.

POTASSIUM PERMANGANATE.—LONDON: 8¾d. per lb. SCOTLAND: B.P. crystals, 10d. to 10½d. MANCHESTER: B.P., 11½d.

POTASSIUM PRUSSIATE.—LONDON: Yellow, 8½d. to 8¾d. per lb. SCOTLAND: Yellow spot, 8¼d. ex store. MANCHESTER: Yellow, 8¼d.

SALAMMONIAC.—First lump spot, £41 17s. 6d. per ton d/d in barrels. SCOTLAND: Large crystals, in casks, £36.

SODA ASH.—58% spot, £5 12s. 6d. per ton f.o.r. in bags.

SODA, CAUSTIC.—Solid, 76/77° spot, £13 17s. 6d. per ton d/d station. SCOTLAND: Powdered 98/99%, £17 10s. in drums, £18 5s. in casks, Solid 76/77°, £14 12s. 6d. in drums; 70/73%, £14 12s. 6d., carriage paid buyer's station, minimum 4-ton lots; contracts 10s. per ton less. MANCHESTER: £13 5s. to £14 contracts.

SODA CRYSTALS.—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.

SODIUM ACETATE.—LONDON: £21 per ton. SCOTLAND: £20 15s.

SODIUM BICARBONATE.—Refined spot, £10 10s. per ton d/d station in bags. SCOTLAND: Refined recrystallised £10 15s. ex quay or station. MANCHESTER: £10 10s.

SODIUM BICHROMATE.—Crystals cake and powder 4d. per lb. net d/d U.K. discount 5%. Anhydrous, 5d. per lb. LONDON: 4d. per lb. less 5% for spot lots and 4d. per lb. with discounts for contract quantities. MANCHESTER: 4d. per lb. basis. SCOTLAND: 4d. delivered buyer's premises with concession for contracts.

SODIUM BISULPHITE POWDER.—60/62%. £20 per ton d/d 1 cwt. iron drums for home trade.

SODIUM CARBONATE, MONOHYDRATE.—£15 per ton d/d in minimum ton lots in 2 cwt. free bags. Soda crystals, SCOTLAND: £5 to £5 5s. per ton ex quay or station. Powdered or pea

quality, 7s. 6d. per ton extra. Light Soda Ash, £7 ex quay, min. 4-ton lots with reductions for contracts.

SODIUM CHLORATE.—£30 per ton. SCOTLAND: 3⅜d. per lb.

SODIUM CHROMATE.—4d. per lb. d/d U.K.

SODIUM HYPOSULPHITE.—SCOTLAND: Large crystals English manufacture, £9 5s. per ton ex stations, min. 4-ton lots. Pea crystals, £14 10s. ex station, 4-ton lots. MANCHESTER: Commercial, £10 5s.; photographic, £14 10s.

SODIUM METASILICATE.—£14 per ton, d/d U.K. in cwt. bags.

SODIUM IODIDE.—B.P., 6s. per lb.

SODIUM NITRITE.—LONDON: Spot, £18 5s. to £20 5s. per ton d/d station in drums.

SODIUM PERBORATE.—10%, 9½d. per lb. d/d in 1-cwt. drums. LONDON: 10d. per lb.

SODIUM PHOSPHATE.—£13 per ton.

SODIUM PRUSSIATE.—LONDON: 5d. to 5½d. per lb. SCOTLAND: 5d. to 5⅝d. ex store. MANCHESTER: 5d. to 5½d.

SODIUM SILICATE.—140° Tw. Spot, £8 per ton. SCOTLAND: £8 10s.

SODIUM SULPHATE (GLAUBER SALTS).—£4 2s. 6d. per ton d/d SCOTLAND: English material, £3 15s.

SODIUM SULPHATE (SALT CAKE).—Unground spot, £3 12s. 6d. per ton d/d station in bulk. SCOTLAND: Ground quality, £3 5s. per ton d/d. MANCHESTER: £3 5s.

SODIUM SULPHIDE.—Solid 60/62% Spot, £10 15s. per ton d/d in drums; crystals 30/32%, £8 per ton d/d in casks. SCOTLAND: For home consumption, Solid 60/62%, £10 5s.; broken 60/62%, £11 5s.; crystals, 30/32%, £8 7s. 6d., d/d buyer's works on contract, min. 4-ton lots. Spot solid, 5s. per ton extra. Crystals, 2s. 6d. per ton extra. MANCHESTER: Concentrated solid, 60/62%, £11; commercial, £8 2s. 6d.

SODIUM SULPHITE.—Pea crystals, spot, £13 10s. per ton d/d station in kegs. Commercial spot, £8 15s. d/d station in bags.

SULPHUR.—£9 10s. to £9 15s. per ton. SCOTLAND: £8 to £9.

SULPHATE OF COPPER.—Manchester: £14 15s. per ton f.o.b.

SULPHUR CHLORIDE.—5d. to 7d. per lb., according to quality.

SULPHUR PRECIP.—B.P., £55 to £60 per ton according to quantity. Commercial, £50 to £55.

VERMILION.—Pale or deep, 5s. 1d. per lb. in 1-cwt. lots.

ZINC CHLORIDE.—SCOTLAND: British material, 98%, £18 10s. per ton f.o.b. U.K. ports.

ZINC SULPHATE.—LONDON: £12 per ton. SCOTLAND: £10 10s.

ZINC SULPHIDE.—10d. to 11d. per lb.

Coal Tar Products

ACID, CRESYLIC.—99/100%, 2s. to 2s. 9d. per gal., according to specification; pale 98%, 1s. 10d. to 1s. 11d.; dark, 1s. 6d. to 1s. 7d. LONDON: 98/100%, 1s. 4d.; dark, 95/97%, 1s. SCOTLAND: Pale, 99/100%, 1s. 3d. to 1s. 4d.; dark, 97/99%, 1s. to 1s 1d.; high boiling acid, 2s. 6d. to 3s.

ACID, CARBOLIC.—Crystals, 6¾d. to 7½d. per lb.; crude, 60's, 1s. 11½d. to 2s. 2½d. per gal. MANCHESTER: Crystals, 7¼d. per lb.; crude, 2s. 1d. per gal. SCOTLAND: 60's, 2s. 6d. to 2s. 7d.

BENZOL.—At works, crude, 9½d. to 10d. per gal.; standard motor 1s. 3d. to 1s. 3½d.; 90%, 1s. 4d. to 1s. 4½d.; pure, 1s. 7½d. to 1s. 8d. LONDON: Motor, 1s. 3½d. SCOTLAND: Motor, 1s. 6½d.

CREOSOTE.—B.S.I. Specification standard, 5½d. per gal. f.o.r. Home, 3¾d. d/d. LONDON: 4¼d. f.o.r. North; 5d. London. MANCHESTER: 4½d. to 5¼d. SCOTLAND: Specification oils, 4d.; washed oil, 4¼d. to 4¾d.; light, 4¼d.; heavy, 4¼d. to 4½d.

NAPHTHA.—Solvent, 90/100%, 1s. 5½d. to 1s. 6½d. per gal.; 95/160%, 1s. 9d.; 90%, 1s. to 1s. 2d. LONDON: Solvent, 1s. 3½d. to 1s. 4d.; heavy, 11d. to 1s. 0½d. f.o.r. SCOTLAND: 90/160%, 1s. 3d. to 1s. 3½d.; 90/190%, 11d. to 1s. 2d.

NAPHTHALENE.—Crude, whizzed or hot pressed, £14 10s. per ton; purified crystals, £22 to £23 per ton in 2-cwt. bags. LONDON: Fire lighter quality, £3 to £3 10s.; 74/76 quality, £4 to £4 10s; 76/78 quality, £5 10s. to £6. SCOTLAND: 40s. to 50s.; whizzed, 70s. to 75s.

PYRIDINE.—90/140%, 5s. 3d. to 8s. per gal.; 90/180, 2s. 3d.

TOLUOL.—90%, 2s. 3d. to 2s. 4d. per gal.; pure, 2s. 6d. to 2s. 7d.

XYLOL.—Commercial, 2s. 4d. per gal.; pure, 2s. 6d.

PITCH.—Medium, soft, 43s. to 45s. per ton, in bulk at makers' works. MANCHESTER: 40s. to 42s. 6d. f.o.b., East Coast.

Forthcoming Events

LONDON

Mar. 2.—Society of Chemical Industry (London Section). Joint meeting with the Institute of Chemistry. "The Chemotherapy of Malaria." Dr. T. A. Henry. 8 p.m. Burlington House, London.

Mar. 4.—Society of Glass Technology (London Section). Visit to the Osram-G.E.C. Glass Works, North Wembley. "Glassware Finishing Machinery with special reference to Table Ware." E. Venis. 7 p.m. London.

Mar. 4.—Society of Public Analysts. 8 p.m. Burlington House, Piccadilly, London.

Mar. 5.—Institute of Metals (London Section). "Patent Law—with special reference to Non-Ferrous Metals." G. S. W. Marlow. 7.30 p.m. 83 Pall Mall, London.

Mar. 6.—British Association of Refrigeration. Supper-Dance at Hollywood Restaurant, Princes, Ltd., Piccadilly, London.

Mar. 6.—The Institution of Chemical Engineers. 11 a.m. Fourteenth annual corporate meeting (Business Session. Members only). 11.45 a.m. President's Address: "The Grant of Trading Monopolies—Then and Now," Dr. Herbert Levinstein. 12.45 p.m. Informal luncheon in the Hotel Restaurant. 2.15 p.m. "The Dead Sea—A Storehouse of Chemicals," M. Novomeysky. Hotel Victoria, Northumberland Avenue, London.

Mar. 7.—British Association of Chemists (London Section). Annual Dinner and Dance of the Section. 6.30 p.m. Waldorf Hotel, Aldwych, London.

BIRMINGHAM

Mar. 3.—Electrodepositors' Technical Society. Birmingham Conference. "Historical Development and Practice of Silver Plating," R. E. Close; "Control of Silver Plating Solutions," E. J. Dobbs. 7.30 p.m. James Watt Memorial Institute, Gt. Charles Street, Birmingham.

Mar. 5.—Institute of Metals (Birmingham Section). "Methods of Analysis for Impurities in Copper, etc." F. T. Longman. 7 p.m. James Watt Memorial Institute, Birmingham.

BRISTOL

Mar. 5.—Society of Chemical Industry (Bristol Section). "Recent Developments in the Field of Detergent Preparations." Dr. R. Thomas. 7.30 p.m. University, Woodland Road, Bristol.

GLASGOW

Mar. 6.—Society of Chemical Industry (Glasgow Section). Annual general meeting. 7.42 p.m. Chairman's Address: "Electroplating Developments, 1925-35." J. G. Roberts. 7.30 p.m. Royal Technical College, Glasgow.

MANCHESTER

Mar. 4.—Manchester Metallurgical Society. "Fusion Welded Pressure Vessels." S. F. Dorey. 7 p.m. Engineers' Club, Albert Square, Manchester.

Mar. 5.—The Institute of Vitreous Enamellers (Northern Section). "Enamel Mill Room Practice and Equipment." G. Steele and W. Marshall. 7.30 p.m. Y.M.C.A., Peter Street, Manchester.

Mar. 6.—Society of Chemical Industry (Manchester Section). "The Iraq Pipe-Line." Dr. A. E. Dunstan. 17 Albert Square, Manchester.

LEEDS

Mar. 7.—International Society of Leather Trades' Chemists (British Section). "Evaluation of Bates and Bating Materials." Dr. K. W. Goeller; "Some Experiments on the Deterioration of Vegetable Tanned Leather," Dr. D. Burton; "Molecular Structure of Gelatine." W. R. Atkin and A. N. Kay; "The Sampling of Sole Leather for Analysis," M. C. Lamb. 10 a.m. University, Leeds.

NEWCASTLE-ON-TYNE

Feb. 29.—North of England Institute of Mining and Mechanical Engineers. 2.30 p.m. Lecture Theatre of the Institute, Newcastle-on-Tyne.

Mar. 3.—Institute of Chemistry (Newcastle-on-Tyne Section). "The Economist in the Modern World." E. D. McCallum. Newcastle-on-Tyne.

PONTEFRACT

Mar. 4.—Society of Glass Technology (Yorkshire Section). "Some Factors Affecting the Lives of Milk Bottles." Harold Bateson. 7.30 p.m. The Red Lion Hotel, Pontefract.

Company News

John Oakey and Sons.—The payment of a dividend of 10 per cent., less tax, making 12½ per cent. for year, is announced.

Salt Union.—The ordinary dividend is maintained at 9 per cent. It is proposed to place £30,000, as in the previous year, to contingencies, and to carry forward £15,000. In 1934 the amount carried forward was £10,988.

Yorkshire Indigo Scarlet and Colour Dyers.—The report for 1935 shows a profit, after depreciation, etc., of £4,890, against £2,628 in the previous year; debenture interest takes £4,514, leaving £376. The deficiency of £6,256 brought in is thus reduced to £5,879.

United Water Softeners.—The profit for 1935, after all expenses, including depreciation, directors' fees, income-tax, was £17,508, against £15,078, plus £3,043, brought in, making a total of £20,551. The ordinary dividend is 7 per cent., against 6 per cent., leaving to be carried forward £3,689.

International Paint and Compositions Co.—The preliminary statement for 1935 shows that profits have risen by £12,655, to £115,091. The directors recommend a final dividend of 11 per cent. on the ordinary shares, making 14 per cent. For 1934, shareholders received 10 per cent., compared with 9 per cent. for each of the three preceding years.

British Xylonite Co., Ltd.—At a meeting of the board of directors held on February 19, final dividends in respect of the year ended December 31, 1935, were recommended at the rate of 2½ per cent. actual, less income-tax, on the 5 per cent. cumulative preference shares, making 5 per cent., less income-tax, for the year, and 6½ per cent. actual, less income-tax, on the ordinary shares, making 9 per cent., less income-tax, for the year. Dividends are payable on March 31, 1936, to members registered on March 13, 1936.

Chemical and Allied Stocks and Shares

THERE has been a good deal of profit-taking in evidence in the industrial section of the Stock Exchange this week. Among shares of chemical and allied companies prices were affected to some extent by the general market tendency, but they continued active in most cases. Imperial Chemical have not held best prices touched, although they again attracted more attention. The view is current in some quarters that the dividend for the year may be raised moderately, but the general belief is that it will be kept at 8 per cent., as the directors are likely to continue to place a good proportion of the profits back into the business, at least until the outlook for international trade is more encouraging generally. William Blythe 3s. ordinary shares have reacted from 8s. 6d. to 7s. 9d. at the time of writing, but they also remained active. The market is looking for the raising of the dividend from 9 per cent. to 10 per cent. on which basis the yield would work out at around 4 per cent. Salt Union have been lowered, but Borax Consolidated were higher, the full report having created a good impression. Fison, Packard and Prentice were steady, partly on the possibility that a larger interim dividend is in prospect. Cooper, McDougall and Robertson were also steady on the hopes that the forthcoming results may show a rather larger dividend. Imperial Smelting have retained most of their recent good rise. Provided the price of zinc remains favourable the market view is that the ordinary shares may re-enter the dividend list this year with a payment of 5 per cent. International Paint ordinary shares have responded to the larger dividend. Pinchin Johnson were relatively steady, although opinion in the market is divided somewhat as to whether there will be a larger dividend in this case as the directors might decide to deal conservatively with profits if they consider general conditions for the company's important trade abroad and overseas are not encouraging. Lewis Berger held up well on the possibility that the interim dividend may be raised. Blythe Colour Works 4s. shares continued active and are higher on the week at around 12s. The various issues of Dorman Long have lost part of their recent gains. This is not attributed to less favourable views as to the company's outlook, but largely as a sympathetic movement in accordance with the general trend in leading iron and steel shares after their large advance. Consett Iron have reacted rather sharply. In this case the directors intimated last week that they have decided on reorganisation of the capital. This was expected by the market in order to pave the way for dividends on the share capital, but the disposition is to await the full details of the directors' plans, likely to be announced early in March. Lawes' Chemical and British Drug Houses have continued to hold the higher prices made recently, but they did not attract much attention, judged by recorded dealings. Goodlass Wall was another share to hold up well. Courtaulds have kept at a lower level, awaiting the meeting for statements as to the outlook for the rayon trade generally. British Cyanides were little changed. In some quarters there are hopes that the latter company may commence the practice of paying an interim dividend this year. Reckitt and Sons ordinary and Associated Portland Cement continued to attract attention on the belief that the results for the year will again make an excellent showing and that shareholders may receive some form of increased distribution. Unilever were active and Levers preference shares well maintained. The latter shares probably have a more active market than any other preference shares in the industrial list. United Premier Oil and Cake are virtually unchanged at the time of writing, favourable estimates of the final dividend having continued in the market. Boots Pure Drug were also little changed, hopes of a larger dividend or some form of bonus having persisted. Bradford Dyers remained dull under the influence of the past year's results. British Oxygen have not held best prices, being affected by the general market trend, in common with the majority of very active shares. United Molasses were again less in evidence. The disposition in the market is to await confirmation of hopes that an interim dividend may be resumed. Oil shares attracted rather more business on favourable market views as to dividend prospects.

Name.	Feb. 25.	Feb. 18.
Anglo-Iranian Oil Co., Ltd. Ord.	90/7½	89/4½
,, 8% Cum. Pref.	36/-	36/9
,, 9% Cum. Pref.	37/-	37/-
Associated Dyers and Cleaners, Ltd. Ord.	1/10½	1/10½
,, 6½% Cum. Pref.	6/3	6/3
Associated Portland Cement Manufacturers, Ltd. Ord.	79/-	78/-
,, 5½% Cum. Pref.	28/-	28/-
Benzol & By-Products, Ltd. 6% Cum. Part Pref.	2/6	2/6
Berger (Lewis) & Sons, Ltd. Ord.	70/-	70/7½
Bleachers' Association, Ltd. Ord.	6/3	6/10½
,, 5½% Cum. Pref.	12/6	11/10½
Boake, A., Roberts & Co., Ltd. 5% Pref. (Cum.)	20/-	20/-
Boots Pure Drug Co., Ltd. Ord. (5/-)	57/-	56/9
Borax Consolidated, Ltd. Pfd. Ord. (£)	115/-	112/6
,, Defd. Ord.	25/-	23/7½
,, 5½% Cum. Pref. (£10)	£11/17/6	£11/17/6
,, 4½% Deb. (1st Mort.) Red. (£100)	£107/10/-	£107/10/-
,, 4½% 2nd Mort. Deb. Red. (£100)	£105/10/-	£105/10/-
Bradford Dyers' Association, Ltd. Ord.	8/9	8/9
,, 5% Cum. Pref.	11/3	11/3
,, 4% 1st Mort. Perp. Deb. (£100)	£86/10/-	£87/10/-
British Celanese, Ltd. 7% 1st Cum. Pfd.	25/-	25/-
,, 7½% Part. 2nd Cum. Pref.	22/-	22/6
British Cotton & Wool Dyers' Association Ltd. Ord. (5/-)	6/3	6/3
,, 4% 1st Mort. Deb. Red. (£100)	£96	£96
British Cyanides Co., Ltd. Ord. (2/-)	4/3	4/3
British Drug Houses, Ltd. Ord.	21/3	18/1½
,, 5% Cum. Pref.	21/10½	21/10½
British Glues and Chemicals, Ltd. Ord. (4/-)	8/1½	8/1½
,, 8% Pref. (Cum. and Part.)	30/-	28/9
British Oil and Cake Mills, Ltd. Cum. Pfd. Ord.	48/9	48/9
,, 5½% Cum. Pref.	25/7½	25/7½
,, 4¼% First Mort. Deb. Red. (£100)	£107/10/-	£107/10/-
British Oxygen Co., Ltd. Ord.	122/6	125/-
,, 6¼% Cum. Pref.	32/6	32/6
British Portland Cement Manufacturers, Ltd. Ord.	93/9	92/6
,, 6% Cum. Pref.	30/-	30/-
Bryant & May, Ltd. Pref.	67/6	66/3
Burt, Boulton & Haywood, Ltd. Ord.	20/-	20/-
,, 7% Cum. Pref.	27/6	27/6
,, 6% 1st Mort. Deb. Red. (£100)	£102/10/-	£102/10/-
Bush, W. J., & Co., Ltd. 5% Cum. Pref. (£5)	112/6	112/6
,, 4% 1st Mort. Deb. Red. (£100)	£96/10/-	£96/10/-

Name.	Feb. 25.	Feb. 18.
Calico Printers' Association, Ltd. Ord.	8/9	8/9
,, 5% Pref. (Cum.)	12/3	14/4½
Cellulose Acetate Silk Co., Ltd. Ord.	13/5¼	13/5¼
,, Deferred (1/-)	2/4½	2/4½
Consett Iron Co., Ltd. Ord.	12/9	16/-
,, 8% Pref.	35/-	36/3
,, 6% First Deb. stock, Red. (£100)	£109/10/-	£109/10/-
Cooper, McDougal & Robertson, Ltd. Ord.	38/9	38/9
,, 7% Cum. Pref.	30/-	30/-
Courtaulds, Ltd. Ord.	56/10½	56/7½
,, 5% Cum.	26/3	26/3
Crosfield, Joseph, & Sons, Ltd. 5% Cum. Pre-Pref.	25/7½	25/-
,, Cum. 6% Pref.	28/9	28/9
,, 6½% Cum. Pref.	31/10½	31/10½
,, 7½% "A" Cum. Pref.	32/6	32/6
Distillers Co., Ltd. Ord.	102/6	102/6
,, 6% Pref. Stock Cum.	32/-	32/-
Dorman Long & Co., Ltd. Ord.	28/9	28/9
,, Pref. Ord.	40/-	42/6
,, 6½% Non-Cum. 1st Pref.	24/9	25/3
,, 8% Non-Cum. 2nd Pref.	26/3	26/10½
,, 4% First Mort. Perp. Deb. (£100)	£103/10/-	£103/10/-
,, 5% 1st Mort. Red. Deb. (£100)	£106/10/-	£106/10/-
English Velvet & Cord Dyers' Association Ltd. Ord.	4/4½	4/4½
,, 5% Cum. Pref.	7/6	7/6
,, 4% First Mort. Deb. Red. (£100)	£72/10/-	£72/10/-
Fison, Packard & Prentice, Ltd. Ord.	45/7½	46/3
,, 7% Non-Cum. Pref.	31/3	31/3
,, 4½% Debs. (Reg.) Red. (£100)	£106	£106
Gas Light and Coke Co.	28/-	28/-
,, 3½% Maximum Stock (£100)	£89/10/-	£89/10/-
,, 4% Consolidated Pref. Stock (£100)	£108/10/-	£108/10/-
,, 3% Consolidated Deb. Stock, Irred. (£100)	£92/10/-	£92/10/-
,, 5% Deb. Stock Red. (£100)	£118/10/-	£118/10/-
,, 4½% Red. Deb. Stock (1960-65) (£100)	£115/10/-	£115/10/-
Goodlass Wall & Lead Industries, Ltd. Ord. (10/-)	15/7½	15/7½
,, 7% Prefd. Ord. (10/-)	13/9	13/9
,, 7% Cum. Pref.	30/-	30/-
Gossage, William, & Sons, Ltd. 5% 1st Cum. Pref.	24/4½	24/4½
,, 6½% Cum. Pref.	30/-	28/9
Imperial Chemical Industries, Ltd. Ord.	39/6	39/6
,, Deferred (10/-)	9/7½	9/7½
,, 7% Cum. Pref.	34/-	34/-

Name.	Feb. 25.	Feb. 18.
Imperial Smelting Corporation, Ltd. Ord.	18/3	17/9
,, 6½% Pref. (Cum.)	25/7½	25/7½
International Nickel Co. of Canada, Ltd. Cum.	$52	$51½
Johnson, Matthey & Co., Ltd. 5% Cum. Pref. (£5)	105/-	105/-
,, 4% Mort. Deb. Red. (£100)	£98/10/-	£98/10/-
Laporte, B., Ltd. Ord.	117/6	112/6
Lawes Chemical Co., Ltd. Ord. (1/-)	9/4½	8/9
,, 7% Non-Cum. Part Pref. (10/-)	10/-	10/-
Lever Bros., Ltd. 7% Cum. Pref.	33/-	33/-
,, 8% Cum. "A" Pref.	33/6	33/6
,, 20% Cum. Prefd. Ord.	80/-	80/-
,, 5% Cons. Deb. (£100)	£108/10/-	£108/10/-
,, 4% Cons. Deb. (£100)	£106/10/-	£106/10/-
Magadi Soda Co., Ltd. 12½% Pref. Ord. (5/-)	1/3	1/3
,, 6% 2nd Pref. (5/-)	6d.	6d.
,, 6% 1st Debs. (Reg.)	£45	£40
Major & Co., Ltd. Ord. (5/-)	7½d.	7½d.
,, 8% Part. Prefd. Ord. (10/-)	9d.	9d.
,, 7½% Cum. Pref.	1/6¾	1/6¾
Pinchin, Johnson & Co., Ltd. Ord. (10/-)	44/-	44/6
,, 1st Pref. 6½% Cum.	32/-	32/-
Potash Syndicate of Germany (Deutsches Kalisyndikat G.m.b.H.) 7% Gld. Ln. Sr. "A" and "B" Rd.	£77	£75
Reckitt & Sons, Ltd. Ord.	120/-	120/-
,, 4½% Cum. 1st Pref.	24/4½	24/4½
Salt Union, Ltd. Ord.	50/-	50/-
,, Pref.	47/6	47/6
,, 4½% Deb. (£100)	£107/10/-	£107/10/-
South Metropolitan Gas Co. Ord. (£100)	£127/10/-	£127/10/-
,, 6% Irred. Pref. (£100)	£149/10/-	£149/10/-
,, 4% Pref. (Irred.) (£100)	£105	£105
,, Perpetual 3% Deb. (£100)	£89/10/-	£89/10/-
,, 5% Red. Deb. 1950-60 (£100)	£115/10/-	£115/10/-
Staveley Coal and Iron Co., Ltd. Ord.	53/1½	53/9
Stevenson & Howell, Ltd. 6½% Cum. Pref.	26/3	26/3
Triplex Safety Glass Co., Ltd. Ord. (10/-)	89/4½	89/4½
Unilever, Ltd. Ord.	35/-	35/-
,, 7% Cum. Pref.	31/9	31/9
United Glass Bottle Manufacturers, Ltd. Ord.	44/6	44/-
,, 7½% Cum. Pref.	32/6	32/6
United Molasses Co., Ltd. Ord. (6/8)	25/7½	26/3
,, 6% Cum. Pref.	26/3	26/3
United Premier Oil & Cake Co., Ltd. Ord. (5/-)	11/6	11/9
,, 7% Cum. Pref.	25/7½	25/7½
,, 4½% Deb. Red. (£100)	£104	£104

Inventions in the Chemical Industry

THE following information is prepared from the Official Patents Journal. Printed copies of Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given under "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

Specifications Open to Public Inspection

SEPARATION OF HYDROCARBON MIXTURES, processes.—Naamlooze Vennootschap Machinerieen-en Apparaten Fabrieken Meaf. Aug. 7, 1934. 22219/35.

ORGANIC COMPOUNDS.—British Thomson-Houston Co., Ltd. Aug. 10, 1934. 22221/35.

WORKING-UP ACID SLUDGE and similar materials and apparatus therefor, processes.—Pape and Co., Ges. Aug. 4, 1934. 22231/35.

TREATMENT OF SOLUTIONS having a colloidal and crystalloidal character and in particular sugar juices and residual liquors, process.—E. J. Hugel. Aug. 4, 1934. 22240/35.

STABILISATION OF MOTOR FUELS.—E. I. due Pont de Nemours and Co. Aug. 8, 1934. 22348/35.

DISPERSIONS OF HALOGENOBUTADIENES, production.—E. I. du Pont de Nemours and Co. Aug. 8, 1934. 22350-1/35.

CRYSTALLINE SUBSTANCES, process of manufacturing.—Naamlooze Vennootschap Chemische Fabriek Gembo. Aug. 8, 1934. 22454/35.

PRODUCTS CONTAINING SULPHURIC ACID DERIVATIVES, manufacture.—E. Waldmann and A. Shwala. Aug. 10, 1934. 22513/35.

DERIVATIVES OF PYRIDINE AND QUINOLINE and their preparation. Kodak, Ltd. Aug. 9, 1934. 22537/35.

ALKYL HALIDES, manufacture.—I. G. Farbenindustrie. Aug. 10, 1934. 22620/35.

Specifications Accepted with Date of Application

CONDENSATION PRODUCTS, manufacture.—I. G. Farbenindustrie. May 2, 1933. 442,129.

VAT DYESTUFF, manufacture.—Imperial Chemical Industries, Ltd. and R. J. Loveluck. May 31, 1934. 442,209.

PRODUCTS COMPRISING VEGETABLE PHOSPHATIDES, production.—Hanseatische Muhlenwerke A.-G. Dec. 13, 1933. 442-212.

SEPARATION FROM OIL OF WAX or other matter which is precipitated upon cooling the oil.—Union Oil Co. of California. July 17, 1933. 442,429.

ARTIFICIAL SILK, manufacture.—I. G. Farbenindustrie. July 3, 1934. (Addition to 434,881.) 442,367.

PIPE JOINTS OR COUPLINGS.—H. W. Brownsdon, F. Gee, H. F. Wagstaff and Imperial Chemical Industries, Ltd. July 3, 1934. 442,431.

SECONDARY ALKYL RESORCINOLS, methods of preparing.—W. E. Austin. July 26, 1933. 442,369.

SECONDARY ALKYL CHLORORESORCINOLS, methods of preparing.—W. E. Austin. July 26, 1933. 442,370.

SPLITTING OF HYDROCARBONS of high boiling point into those of lower boiling point.—Coutts and Co. and F. Johnson (legal representatives of J. Y. Johnson (deceased)) (I. G. Farbenindustrie). July 28, 1934. 442,371.

LUBRICANTS.—Standard Oil Development Co. Aug. 29, 1933. 442,289.

SULPHUR DIOXIDE, manufacture.—B. E. F. Rhodin and D. Munroe. July 30, 1934. 442,437.

GENERATION OF FOAM FOR FIRE-EXTINCTION, method and apparatus.—H. V. Reed. Aug. 1, 1934. 442,372.

CHROMO-COMPLEX COMPOUNDS of monoazo dyestuffs, manufacture.—A. Carpmael (I. G. Farbenindustrie). Aug. 2, 1934. 442,152.

DYEING PELTS, HAIRS, OR FEATHERS, process.—I. G. Farbenindustrie. Aug. 1, 1934. 442,373.

BASIC ALUMINIUM SULPHATE, production.—British Aluminium Co., Ltd., and S. F. Derbyshire. Aug. 1, 1934. 442,144.

ORTHOCHROMATIC SENSITISATION of photographic silver halide emulsions.—I. G. Farbenindustrie. Aug. 3, 1933. 442,160.

LUBRICATING OILS.—Standard Oil Development Co. Dec. 27, 1933. 442,161.

DYESTUFFS OF THE THIOINDIGO SERIES, manufacture.—A. Carpmael (I. G. Farbenindustrie). Aug. 24, 1934. 442,167.

ESTERS FROM OLEFINES, production.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. Sept. 2, 1933. 442,454.

EXTRACTION OF ORGANIC MATERIALS.—K. Gebhart (née Zurkalowski). Sept. 7, 1933. 442,232.

Applications for Patents

(February 6 to 12 inclusive.)

UNSATURATED COMPOUNDS, hydrogenation.—Anglo-Iranian Oil Co., Ltd., and A. E. Dunstan. 3848.

MIXED ESTERS OF CELLULOSE, manufacture.—H. A. Auden and Distillers Co., Ltd. 4162.

DERIVATIVES OF CROTONIC ACID, manufacture.—H. A. Auden and H. P. Standinger. 4163.

DISTILLATION OF OILS, etc., apparatus.—F. G. Baender. (May 16, '35.) 4124.

FILTERS FOR LIQUIDS, ETC.—P. Belyavin. 3614.

FOILS AND FILMS FROM CELLULOSE ESTERS, manufacture.—E. Berl. 3562.

ARTICLES FROM ACETYLCELLULOSE, manufacture.—R. Bosch. (Germany, Feb. 11, '35.) 3730.

METALLURGICAL PROCESSES.—H. A. Brassert, H. A. Brassert and Co., Ltd., and T. P. Colclough. 4270.

COLOURING COMPOSITIONS.—British Celanese, Ltd. (United States, Feb. 9, '35.) 3741.

DYESTUF COMPOSITIONS.—British Celanese, Ltd. (United States, Feb. 11, '35.) 4115.

PLASTIC-MOULDING COMPOSITIONS.—British Cyanides Co., Ltd. 4168, 4169.

TITANIUM PIGMENTS.—British Titan Products Co., Ltd. (United States, Feb. 11, '35.) 4159.

EMULSIFYING, ETC., APPARATUS.—J. J. Caldwell and Son, Ltd. 3865.

ARTIFICIAL RESINS.—Carbide and Carbon Chemicals Corporation. (United States, Feb. 9, '35.) 3881. (United States, Jan. 16.) 3882.

CYCLIC AMINOSULPHONIC ACID AMIDE COMPOUNDS, manufacture.—A. Carpmael (I. G. Farbenindustrie). 4166, 4167.

MAGNESIUM PRODUCTS.—H. H. Chesny and Marine Chemicals, Co., Ltd. 3842.

DYESTUFFS FOR ESTERS OF CELLULOSE, etc., manufacture..—Compagnie Nationale de Matieres Colorantes et Manufactures de Produits Chimiques du Nord Reunies Etablissements Kuhlmann.

New Companies Registered

E. H. Butler and Son, Ltd.—Registered February 15. Nominal capital £30,000. To acquire the business of manufacturing chemists carried on by Edwin Henry Butler and Edwin Harold Butler at 93 Humberstone Gate, Leicester, as "E. H. Butler and Son." Directors: Edwin Henry Butler, 27 Roundhill Road, Leicester; Edwin Harold Butler.

Tampimex Oil Products, Ltd., 56 Lady Somerset Road, N.W.5. —Registered February 5. Nominal capital of £5,000. The objects are to buy, sell, distribute and deal in petrol, oil, bitumen, asphalte and all kinds of tar products, chemicals, metals, ores and mineral substances of all kinds; to carry on the business of shipowners, wharfingers, etc. A subscriber: W. Grummitt.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Mortgages and Charges

(NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt as specified in the last available Annual Summary, is also given marked with an *—followed by the date of the Summary, but such total may have been reduced.)

E. C. D. LTD., Tonbridge, manufacturers of chemical apparatus, etc. (M., 29/2/36.) Registered February 18, mortgage, to Midland Bank, Ltd., securing all moneys due or to become due to the Bank; charged on lands at Tonbridge, etc. *——. July 17, 1935.

MANGER'S SALT WORKS, LTD. (late Stubbs & Co., Ltd.), London, E. (M., 29/2/36). Registered February 12, equitable mortgage to Lazard Brothers & Co., Ltd., 11 Old Broad Street, E.C., securing all moneys due or to become due under revolving acceptance credit up to £20,000; charged on company's old and new works in or near Common Road and 23 Providence Place. Marston, etc. *Nil. June 6, 1935.

NORTH BRITISH RAYON LTD., London, W.C. (M., 29/2/36.) Registered February 12, £20,000 bond, etc., to Prudential Assurance Co., Ltd.,; charged on 1-76 Parkside, Jedburgh, and land adjoining 1 and 2 Parkside. *£101,568. November 14, 1935.

SHIP CARBON CO. OF GREAT BRITAIN, LTD., London, E.C. (M., 29/2/36.) Registered February 14, £125,000 debentures; general charge (subject, etc.). *Nil. January 13, 1936.

Satisfaction

H. D. POCHIN & CO., LTD., St. Austell, manufacturing chemists, etc. (M.S., 29/2/36.) Satisfaction registered February 14, £15,300, registered April 22, 1933.

County Court Judgments

(NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court Judgments against him.)

MATTHEWS PRODUCTS LTD., 8 Breakspears Road, S.E.4, chemical manufacturers. (C.C., 29/2/36.) £14 15s. 0d. January 13.

DEKUR LABORATORIES, LTD., Imperial House, 80/86 Regent Street, W., manufacturing chemists. (C.C., 29/2/36.) £87 13s. 3d. January 27.

Receivership

NORSIL, LTD. (R., 29/2/36.) C. H. Haswell, of 59 Gracechurch Street, E.C., was appointed receiver and manager on February 6, 1936, under powers contained in debentures dated June 4, 1935.

Company Winding-Up

INTERNATIONAL OIL CORPORATION. (C.W.U., 29/2/36.) First meeting at the Registrar's Court, County Court Building, Quay Street, Manchester, March 10; creditors at 2.30 p.m., and contributories at 3 p.m.

Voluntary Liquidation

ALARCAL, LTD., anodising specialists, Alperton Lane, Wembley.—The statutory meeting of creditors was held on February 18 at the First Avenue Hotel, London, when a statement of affairs prepared by Percy Phillips and Co., accountants, was submitted which showed ranking liabilities of £3,391 5s. and net assets of £711 5s. 9d., or a deficiency, so far as the creditors were concerned of £2,679 19s. 3d. The issued capital of the company was £10,350, and as regarded the shareholders there was a deficiency of £13,029 19s. 3d. It was reported that the company was incorporated on June 21, 1934, having for its main object the acquiring of a licence to operate an aluminate process of anodising aluminium, etc., and to carry on the business of metallurgists. The nominal capital was £4,000. On November 22, 1934, the capital was increased by £16,000. The deficiency was attributed to loss on trading £7,019; amount written off assets £4,089; amount receivable on 500 ordinary shares, deemed irrecoverable, £500; estimated loss on liability to grantor of licence £698; amount claimed by power supply company for termination of agreement £450; preliminary expenses £203; and debenture interest £39. A resolution was passed confirming the voluntary liquidation, with Mr. Percy Phillips as liquidator.

Chemical Trade Inquiries

The following trade inquiries are abstracted from the "Board of Trade Journal." Names and addresses may be obtained from the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1 (quote reference number).

South Africa.—H.M. Trade Commissioner at Johannesburg reports that the South African Railways and Harbours Administration is calling for tenders, to be presented in Johannesburg by March 30, 1936, for the supply of 7,250 lb. of aluminium powder for paints. (Ref. T.Y. 5731.)

South Africa.—H.M. Senior Trade Commissioner in South Africa reports that the City Council of Bloemfontein is calling for tenders, to be presented in Bloemfontein by April 6, 1936, for the supply of boiler house equipment consisting of two stoker fire boiler units complete with mechanical draught plant, dust extraction plants, ash handling plants, piping and valves and a steel-framed building. (Ref. T.5725.)

Egypt.—The Commercial Secretary to the Residency, Egypt, reports that the Egyptian Ministry of Public Works Mechanical and Electrical Department is calling for tenders, to be presented in Cairo by March 18, 1936, for the construction of cold rooms, refrigerating and ice-making plant for Serum Institute, Ministry of Agriculture. (Ref. T.Y. 5730.)

Egypt.—The Commercial Secretary to the Residency, Egypt, reports that the Department of Public Health, Cairo, is calling for tenders, to be presented in Cairo by May 11, 1936, for the supply of various kinds of bottles; jars; ampoules; india-rubber tubing and teats; cachets; pots; eye baths; boxes, chip and card; toothbrushes; camel-hair brushes; corks; paper bags for powders; filtering papers; oiled paper; litmus paper; envelopes and playing cards. (Ref. T.Y. 10400.)

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Telegrams: "Hydrochloric Fen, London."

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C. B. WOODLEY, C.R.A., F.I.S.A.
General Secretary B.A.C.

"EMPIRE HOUSE,"
175, PICCADILLY,
LONDON, W.1

'Phone: Regent 1611